THE MONTHLY

Review

AUGUST • • • 1946

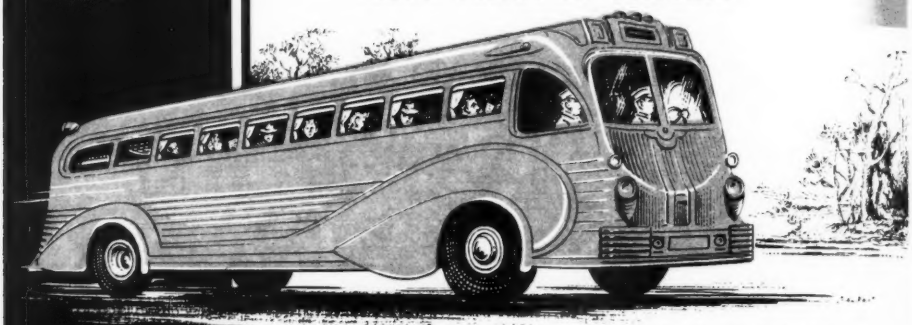
NEW

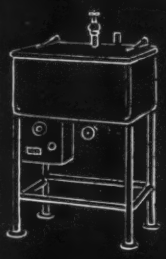
COST REDUCING METHOD

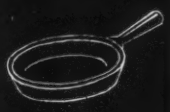
OF JOINING ALUMINUM PARTS

Made Possible thru development of

CLEPO TETRA-DIP PROCESS







In previous years all main assemblies had to be riveted. Now it is possible to replace costly riveting operations with the more economical Spot-Welding Method. It is first essential that all parts be thoroughly cleaned by the Clepo Tetra-Dip Process before spot-welding.

With this new Clepo aluminum surface treatment process and improved spot-welding techniques it is now possible to fabricate complete spot-welded main assemblies such as airplanes, bus bodies, trailers, and railroad coaches. Of course, the Clepo Tetra-Dip Method is also ideal for preparing subassemblies for spot-welding.

Many manufacturers are also finding that the Clepo Tetra-Dip Process is cutting costs and increasing production on spot-welded aluminum articles such as rowboats, canoes, cooking utensils, radio chassis, bathroom clothes hampers, and others.

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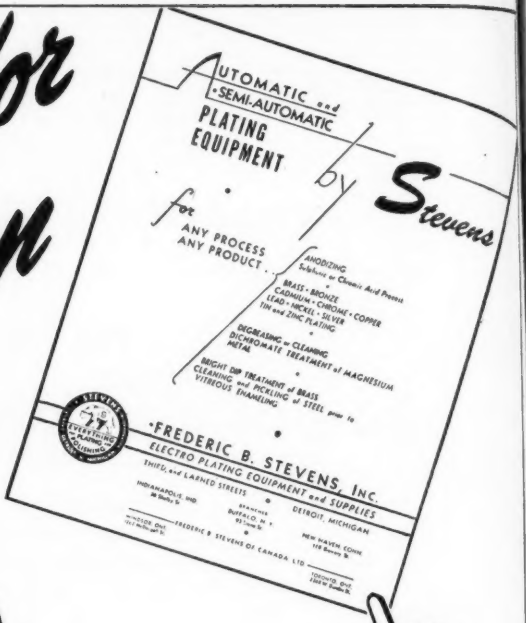

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THE MONTHLY

Review

VOLUME 33 • AUGUST • NUMBER 8

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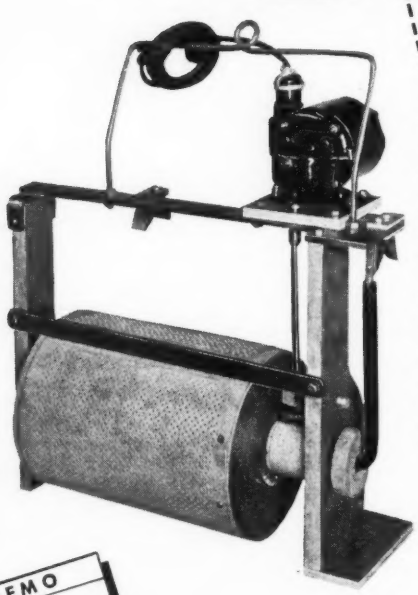

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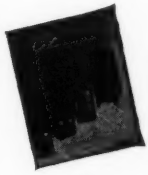

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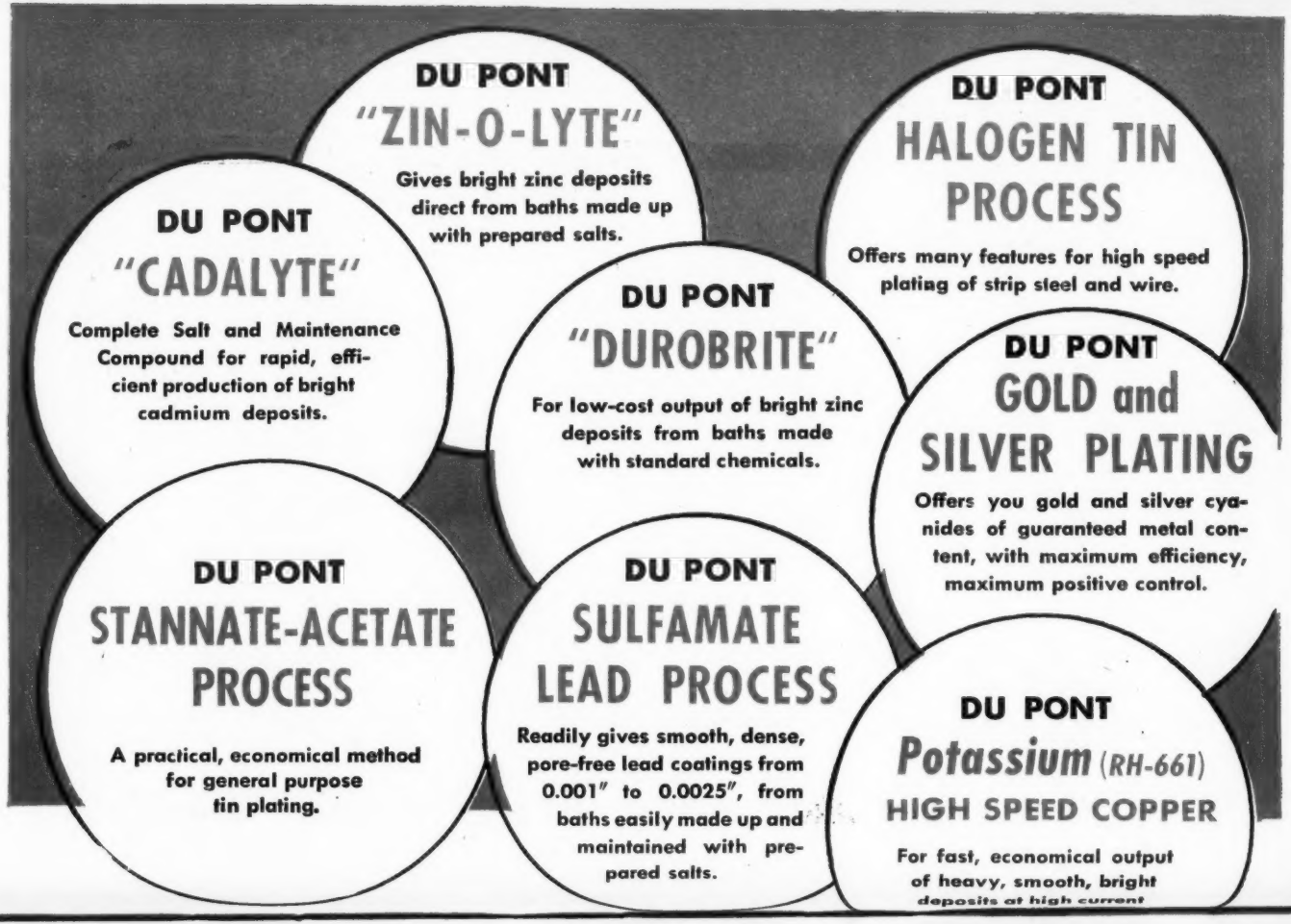
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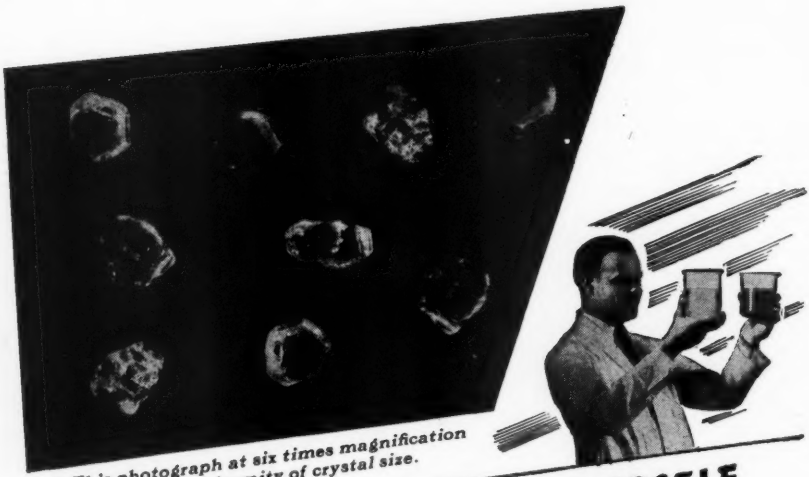

★ *This photograph at six times magnification shows uniformity of crystal size.*

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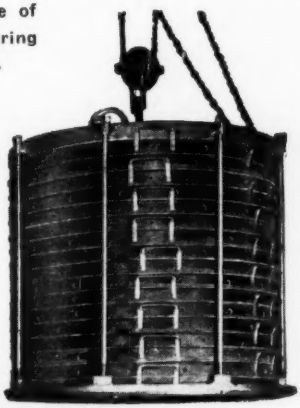

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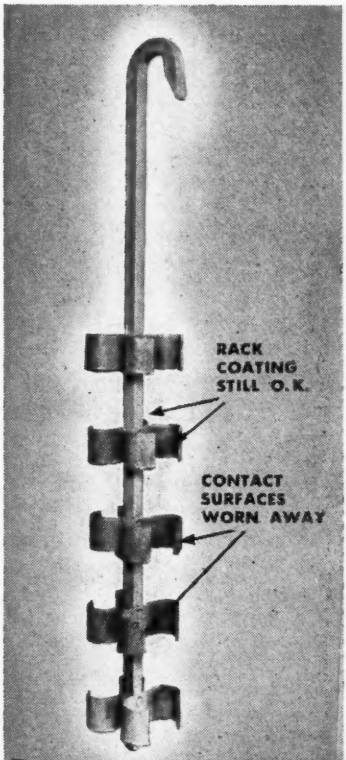

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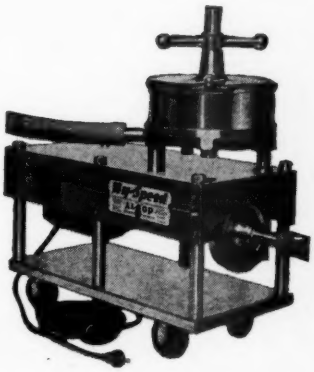

A Quarter Century of development and research in the filtering of plating solutions has contributed many features which make the "*Sealed-Disc*" Filter outstanding.

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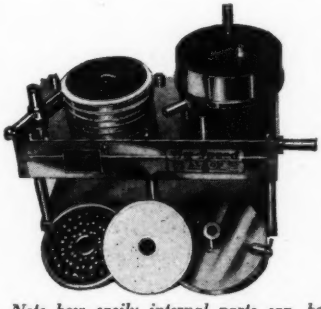

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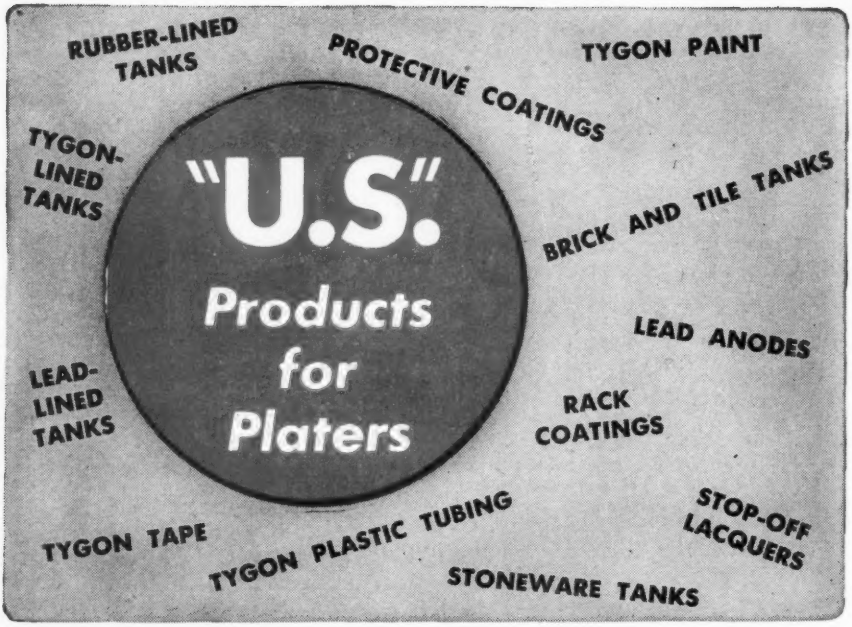

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BUFFING AND POLISHING

A Survey

By E. W. WELLS

Charles F. L'Hommedieu and Sons Company, Los Angeles, California.

Historical

Metals have been polished for ages, but not always for the purpose of preparing them for electrodeposition with another metal. Centuries ago such items as swords, armor, jewelry and household items for the nobility were polished to a high finish, but they would not meet today's standards for quality items.

The evolution of metal polishing has been extremely slow. Handrubbing with sandstone only gradually gave way to the polishing machine driven by foot power, and the automatic methods of today are only of relatively recent origin.

A definite change took place around the turn of the century with the birth of MASS PRODUCTION when demands were made on the electroplater for better finishes and higher output. During this period, bicycles, chandeliers, stove parts, silverware and some automobile parts were moving into mass production. Some beautiful work was turned out, especially in polished brass, white nickel, black nickel and oxidized finishes.

Soon after this period the effects of METALLURGICAL IMPROVEMENTS began to appear in the polishing department. The automobile industry was chiefly responsible for this change. Metals were made harder and tougher by means of changes in alloy composition and in procedures for forging, tempering and heat treating. As a result, polishing wheels began to glaze or throw off the emery, making frequent wheel changes necessary. Production was slowed down and wheel inventories had to be increased. However, as always, "necessity is the mother of invention," or better, perhaps, necessity incites American ingenuity.

New products were put on the market an d new polishing procedures were developed. Some of the items and practices introduced at that time are now universally accepted. The products include polishing wheel cements, greaseless compounds, steel buffing compounds, and new types of emery and wheels. Among the practices are temperature and humidity control in the wheel room, control of compounds and glue, use of wheel-setting machines and of variable-speed polishing lathes.

Wheel Speed

The most important requirement for good polishing and buffing is the regulation of the surface speed of the polishing wheel or buff. All glue, polishing wheel cements, greaseless compound, emery and buffing compounds are manufactured for use in certain speed ranges which have been determined by research instigated by the necessity for meeting present-day requirements.

To demonstrate this fact, select, for instance, a tripoli manufactured by any company, put a fourteen-inch sewed buff on a polishing lathe, place a piece of metal or cardboard in the blower hood, start the lathe at a slow speed, and polish some brass pieces. Remove the metal or cardboard piece from the hood and replace it with another. There will be some tripoli on the withdrawn piece—label it number one and make a record of the number of pieces buffed, the number of times tripoli was applied and the time required to buff

a piece. Then increase the lathe speed stepwise. Each time the speed is increased, polish some more pieces and tabulate the results. It will be found that at a certain surface speed, less tripoli was used and more pieces polished per unit time.

One reason for this behavior is that the tripoli binders require only a certain amount of frictional heat to penetrate the buff. If applied with less heat, they will peel off and disappear into the blower; with more, they will melt off as a liquid which will also enter the blower where it hardens again from the cool air. The compound, which should do a job on the buff, is consumed in clogging the blower system instead. Another reason is that at an incorrect speed, the compound that does get on the buff will just stick to the piece being buffed and cause a cleaning problem in the plating room. This is not the proper method to use in selecting a compound; however, it does show that speed regulation is necessary for economy and finish.

Because of the difference in the hardness of metals, the surface speed is not always the same. For polishing stainless steel or monel, a setup wheel should run at 9,000 surface feet per minute; for buffing them, 12,000 surface feet per minute. Brass should be polished at 6,800 and buffed at 9,500 surface feet per minute. Some difference in cut will be found with different brasses and the optimum wheel speed for highest efficiency will vary slightly.

Wheel Selection

The selection of polishing wheels for roughing, dry and grease wheel fining is also important. True, a grease wheel could be used for roughing, but the resulting finish and the efficiency would be below par. For polishing steel articles with irregular surfaces, a bleached muslin wheel of medium soft density should be used at 7,500 surface feet per minute. This type of wheel allows the bonding medium to penetrate the cloth and hold the abrasive so that, when the periphery of the wheel glides over the irregular shape, it will not only cut the high points.

The grease wheel should be firm colored muslin cloth, sewed and cemented sheepskin, felt, walrus or bullneck. Which to select depends upon the metal to be polished and the regularity of the surface of the piece. For irregular pieces, a colored muslin wheel or quilted sheepskin wheel can be used on most metals. A bullneck, felt or cloth wheel is suitable on steel, a walrus, felt or sewed and cemented sheepskin wheel on brass. The sewed and cemented sheepskin wheel also does a fine job on aluminum. When die castings are polished (today many can be buffed to a satisfactory finish), a flexible bleached muslin wheel is employed.

Use of Tallow

It might be mentioned here that tallow should be used liberally during grease wheel operations on die castings and aluminum. Furthermore, one should make certain that the tallow has the right melting point to assure that it has proper "body." The two metals have a low melting point and if there is not sufficient slippage between the wheel and the metal, the frictional heat will cause either a softening of the metal, which produces a rough, "pulled" effect, or a melting or flow which will leave an imprint of the depth of the abrasive used. On steel, stainless steel and brass, an emery cake is more suitable because it has a higher melting point and heavier body to compensate for the high frictional heat.

Glue vs. Cement

The setting up of polishing wheels has been given considerable study, and the several techniques in use have been decidedly improved from time to time. To this the manufacturers of glue, cement and abrasives have contributed much. Irregardless of the opinions of manufacturers of glue and cement, their fields of usefulness are reflected in the general practice as met with today. For roughing work with from No. 36 to No. 120 abrasive, cement is more economical and produces better results. When finer grades are used, from No. 120 to Grade F, glue will give the better finish. To use both in a job shop may not be satisfactory, unless there is a considerable volume of rough

work. It does pay in the manufacturing plant where the coarse abrasives are employed.

Application of Glue

Glue should be soaked between 30° and 60° F., ground glue for at least one hour, flake glue for at least six hours. The glue solution should then be heated in a water-jacketed kettle to 145° F. which allows 5° for cooling to the point of greatest strength when it is exposed to the air during application. The ratio of glue and water should be checked carefully and should be by weight and not by measure. Coarse abrasive requires a 50% glue solution, medium abrasive a 35% and fine abrasive a 25%. The 25% mix is also used for wheel sizing.

The wheel-drying room should be controlled by both thermostat and hygrometer and be supplied with air vents in the walls near the floor. The temperature should be 90° F. and the humidity 60%. The abrasive should be heated to between 110° and 120° F. to allow the glue to displace the moisture on bonding. This is especially important with a good grade of an alveolated abrasive.

Such general subjects as wheel balancing, sizing, cleaning with pumice, and using a good brush so that bristles do not lodge on the wheel, however important, will not be discussed here.

Application of Cement

The method of applying cement differs somewhat from the glueing method. The cement is not heated. A sizing cement is used first. It is thinner and contains an ingredient which causes it to penetrate thoroughly into the wheel. The abrasive is heated to about 90° F. The wheel room should be kept at 130° F. and a humidity of 35%. After the first head has been dried, the wheel should be taken out of the wheel room and allowed to cool before the second head is applied; otherwise the cement for the second head will take a set before the abrasive has an opportunity to become embedded in it. To get the best results, a glue wheel should dry for at least 12 hours, a cement wheel for about five hours; in both cases the figures apply only where the conditions in the wheel room are properly chosen and maintained.

Greaseless Compounds

Greaseless compounds have been put to many uses during the last few years. They were originally developed to replace wire scratch brushes in the production of satin or butler finishes and have been used successfully for this purpose as well as for cutting down, dry fining and deburring. They have been employed not only on all types of metal but also on plastics, hard rubber, wood and even by egg packers to give cold storage eggs the roughened appearance of fresh eggs.

There are three variables to be altered when different finishes are required, namely speed, grade of compound, and type of buff. Speed is very important and, in most cases, is from 4,000 to 6,000 surface feet per minute. The greaseless compounds are made with various mesh abrasives, usually from No. 46 to No. 400, so that one of the grades selected will do the required job. The buffs range from canvas polishing wheels to rope or string wheels. For the average work, a loose or sewed muslin buff is satisfactory, but there are many jobs that require other types for efficiency or finish.

Preparation for Bright Plating

It has been found that the use of the new high speed bright copper and nickel requires the base metal, particularly steel, to be brought to a higher finish before plating than was necessary with dull copper and nickel coatings. The reason is that buffing of copper and nickel had a tendency to cover up defects in the base metal. To get the better finish on the steel, more attention is being paid to the selection of grain and wheel, and compounds have been developed to buff out the abrasive marks and provide the metal with the luster required for quality work. Also, buffing improves the structure of the steel by closing its pores, which in turn improves the corrosion resistance of the plated finish so that it will last longer.

Automatic Equipment

Today more than ever before, consideration is being given to automatic polishing and buffing. For many years, its use has been limited almost exclusively to very large manufacturers. To meet the competition of the large concerns, the small manufacturers are adopting the same methods.

Since bright plating solutions are not as expensive to install as automatic polishing and buffing equipment, they were put in first by the small manufacturer. Now it is found that the polishing department can not keep up with the modernized plating department. For this reason, plus the high cost of hand polishing, it is turning to automatic polishing.

Of course, every plated item is not adapted to economical automatic polishing and buffing. However, in many cases, it has been found practical to polish part of the item automatically and the balance by hand. Many things have to be taken into account when an installation for automatic polishing and buffing is being considered, such as the number of pieces required in a day, if all or part of the piece can be done automatically, the present or anticipated cost of hand polishing, and the original cost and maintenance of an automatic machine.

There are many standard automatic machines that are satisfactory for a variety of articles and may be set up to do several high production items with a minimum of special adjustment for each item. The automatic is not limited by the size of the item to be polished, but its efficiency may vary greatly on both large and small items. This can only be predetermined by those experienced in the field. As a rule, the recommended machine will do the job because the expense of building and setting it up is so high that the manufacturer of the machine realizes that his reputation is at stake with each sale.

Electropolishing

Still in its infancy, electropolishing is restricted to a limited number of items of certain metals. However, it is expected to have a broader scope within a few years. Theoretically, electropolishing has greater potentiality than automatic mechanical polishing because of the possibilities in bulk polishing and finishing of irregular shapes.

While in the past the evolution of polishing and buffing has been slow, its importance to the quality of plated work is now receiving a recognition which focusses attention on need for further development. Who knows what the ingenuity of today will bring tomorrow?

CHEMISTS ELECT OFFICERS

The Manufacturing Chemists Association of the United States elected officers and 15 executive committee members at its recent annual meeting.

Charles S. Munson, chairman of the executive committee, U. S. Industrial Chemicals, Inc., was elected president to succeed H. L. Derby, president of the American Cyanamid and Chemical Corp.

Leonard T. Beale, president of the Pennsylvania Salt Manufacturing Company, Philadelphia, and H. O. C. Ingraham, vice-president of the General Chemical Company were elected vice-presidents, while J. W. McLaughlin, Carbide and Carbon Chemicals Corp., was named treasurer, and Warren N. Watson, Washington, D. C., was re-elected secretary.

The association, an organization of some 80 chemical corporations, elected the following executive committee:

George W. Merck, president of Merck and Company, chairman; Lammot du Pont, chairman of E. I. du Pont de Nemours, vice-chairman; Mr. Derby; C. S. Hosford, Jr., president of the Victor Chemical Works; John L. Smith, president of Charles Pfizer and Company, Inc.; Clyde D. Marlatt, vice-president of the Martin Dennis Company.

W. S. Landes, vice-president of the Celanese Corporation of America; P. T. Sharples, president of Sharples Chemicals, Inc.; H. I. Young, president of American Zinc, Lead and Smelting Company; and William M. Rand, president of Monsanto Chemical Company.

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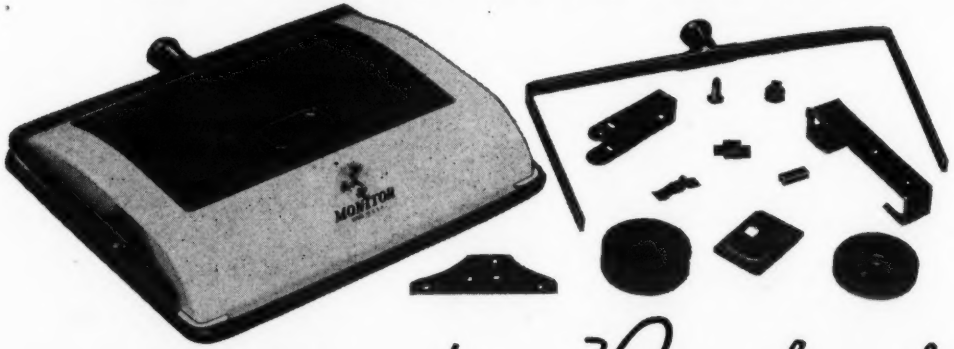

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ENVIRONMENTAL CONTROL of Metal Cleaning Processes

By F. A. PATTY
Industrial Hygeine Consultant
GENERAL MOTORS RESEARCH LABORATORIES—DETROIT, MICHIGAN

This article has been prepared from a lecture given at the "Inservice Training Course in Environmental Controls for Industrial Processes" held at the School of Public Health of the University of Michigan on October 2–4, 1945, and is published with the kind permission of the School.

INTRODUCTION

Metal cleaning appears to become more complex with time and the attendant problems grow more numerous. Possibly that is because we are never satisfied with what we have, but keep looking for something better, faster, cheaper and safer. That has always been a trait of American industry which we hope will never change.

Not all the problems resulting from cleaning are of a production origin—some of them are associated with the control of the environment. New methods should not be adopted hastily without investigation and presentation of convincing evidence of satisfactory environmental controls.

Let us briefly consider some of the factors that influence the choice of cleaning materials and methods.

FACTORS TO BE CONSIDERED IN METAL CLEANING

1. Composition and structure of parts to be cleaned.
2. Soil or dirt to be removed.
3. Preceding and subsequent operations. The preceding operation frequently determines the nature of the contaminant and likewise the cleaning method, and the next following operation often regulates the degree of cleanliness required.
4. Available equipment.
5. Cost of equipment and operating expense.
6. Health and safety problems.

CLASSIFICATION OF CLEANING PROCESSES

For the purpose of this discussion, metal cleaning processes, excluding abrasive and electrolytic methods, may be classified as follows:

Acid Cleaning

Pickling. In the pickling of iron and steel in solutions of sulfuric, hydrochloric or phosphoric acid to prepare the metal for painting, galvanizing, plating or other purposes, the splash hazard and corrosive action on the skin, clothing, and machinery are well recognized. Bubbles of hydrogen gas rise from the bath and carry a sometimes invisible mist of acid into the air, necessitating control by ventilation. The rate of formation of mist depends upon the temperature of the bath, the acid and its concentration, the nature of the metal and its surface area, and whether or not the bath contains an inhibitor. Many commercial organic inhibitors in general use have secret compositions, but paper mill waste, flour mill waste and flour (1 ounce/15 gallons) have been used successfully in general pickling. Inhibitors may work either by forming a protective film which clings to cleaned metal surfaces and slows down the action on the metal more than on the oxide, or by producing a foam which inhibits the escape of mist. The former type usually has proven more successful.

The nature and extent of ventilation control will, of course, depend upon the rate of acid mist escape. Various methods of hooding are used, but lateral exhaust applied at the edge or edges of the tank

a short distance above the surface of the bath is more effective in controlling the mist. The volumes of hooded exhaust or general ventilation required may vary considerably. Where the exposure is a mild one, the addition of an inhibitor may effect sufficient control. Inhibitors should never be added in an automatically timed, conveyorized job without adjusting the timing because the pickling action is slowed by most inhibitors. Chromic acid is sometimes added to the pickling acid, in which case it may be the factor which determines the extent of control required.

The question of what constitutes a harmful exposure is an open one, but most toxicologists agree that in no case should the amount of inorganic acid gas or vapor in the air exceed 10 ppm by volume. Five to eight mg/cu.m of air has been proposed as a safe limit for sulfuric acid. Chromic acid should not exceed 0.1 mg/cu.m of air. The corrosive action on machine tools, instruments, work in progress and finished products may be, in certain instances, of greater importance than the potential injury to health, because in a humid atmosphere any amount of acid gas, vapor or mist will corrode metal. The logical procedure in the case of acid vapors and mists is to provide suitable control wherever any detectable amount is found in the plant atmosphere.

Merely exhausting the acid vapors to the exterior is not always a satisfactory an-

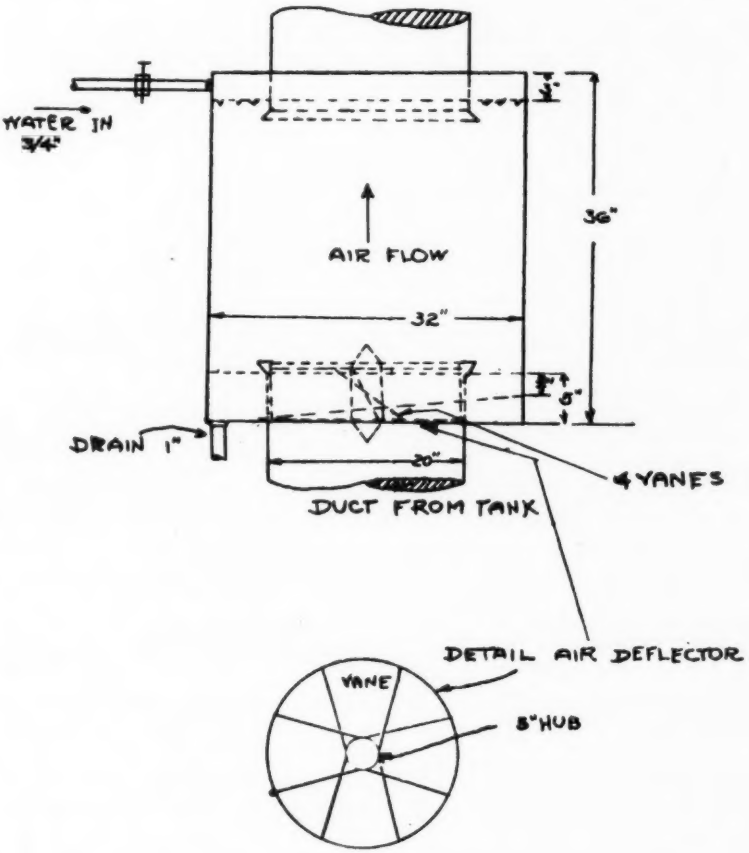

Fig. 1. Mist trap

swer. Damage may result to the roof or roof installations, or the air currents may bring the corrosive vapors back into the plant. Where such a problem exists, mist traps, scrubbers or wet collectors can be used to advantage. A novel mist trap is shown in Fig. 1.

Hydrofluoric acid is employed in some pickling or acid-dipping operations. These baths should be mechanically ventilated, and great care should be exercised to avoid contact of the acid with the worker's skin. In the event of accidental contact, the acid should be washed off immediately and thoroughly, otherwise painful ulceration may develop.

away from the operator's face and prevent him from even momentarily inhaling the concentrated gas. Where hooded enclosures are used, arrangements should be such as to make it unnecessary and inconvenient for the operator to place his face within the enclosure. Exhaust ports on the side opposite the operator are perhaps most successful and convenient. Where an adequate volume is exhausted in this manner, baffles or shields may be dispensed with so as to give unrestricted freedom of operation.

The exhaust arrangement illustrated in Fig. 2 satisfactorily controls one of the most severe exposures ordinarily encountered. A copper tube oil cooler assembly, approxi-

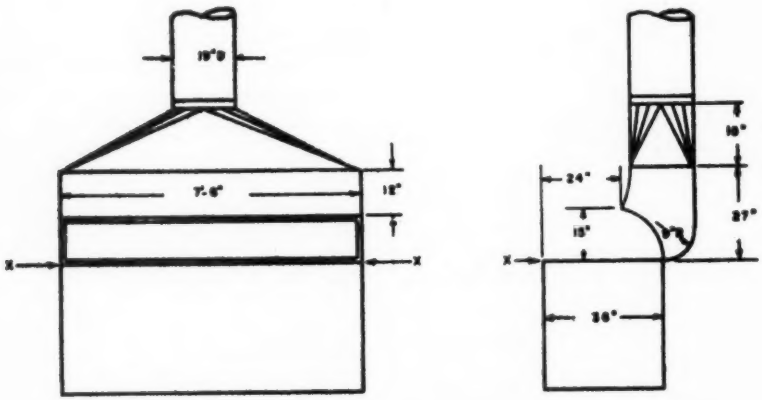

Fig. 2. Hood for bright dip operation. Exhaust volume 175 CFM/sq. ft. surface area of tank. Control velocity 100 ft./min. at front of tank

Bright Dipping. Acid bright dips are usually mixtures of nitric and sulfuric acids. They are employed chiefly to remove tarnish from copper and copper alloys. The operation of dipping the metallic parts into the bath may be conveyorized but is ordinarily done by hand. The extremely corrosive bath is usually contained in a large crock. Brown nitrogen oxide gases (so-called nitrous fumes) are evolved and, since they are very corrosive as well as dangerously toxic, bright dip baths require more efficient hooding and exhaust than do most other metal cleaning operations.

Canopy hoods are not satisfactory. Hoods must be arranged so as to direct the gases

mately 12 by 18 inches in size and essentially a cluster of copper tubes soldered into position, was dipped here to remove tarnish in preparation for additional soldering operations. The assembly was then rapidly withdrawn by hand. Large volumes of nitrogen oxide gases were dispersed, especially while the work was being withdrawn from the bright dip crock and until it was submerged in the rinse crock. Freedom of movement was essential, yet the gas which was generated while the work was moved from one crock to another through the air near the operator's face, had to be completely controlled. Several tests made in the operator's breathing zone by a method

sensitive to two parts per million of nitrogen oxides gave negative results. Since 25 ppm is permissible, this indicated very satisfactory ventilation control. The extraordinarily wide exhaust slot (over 15 inches) on this hood, though it may not give perfect distribution of air flow, gave good air flow where it was most needed—above the center of the bath. Baffles on the side of the hood or less rapid withdrawal of the work would, of course, lower the volume of the exhaust requirement, but when dealing with an exposure where a few inhalations of the uncontrolled atmosphere may be fatal as in the case with nitrogen oxides, liberal ventilation is in order.

Chromic and sulfuric acid bright dips require care to prevent contact with the skin but usually no ventilation control.

Phosphoric Acid Cleaning. Phosphoric acid solution in water is used alone or with the admixture of alcohols and ethers to remove light rust on steel in preparation for lacquering and enameling. It may be applied by dipping, swabbing, or brushing. Usually when sufficient water is employed, the operation does not produce harmful gases or mists that require control measures. Only protection from splashing and contact with the dilute acid is indicated.

Ferric sulfate pickling baths in themselves present no special problem. When the temperature involved is sufficiently high to produce steam, it requires control measures, and if hydrofluoric or other acids are added, they then become the problem for control.

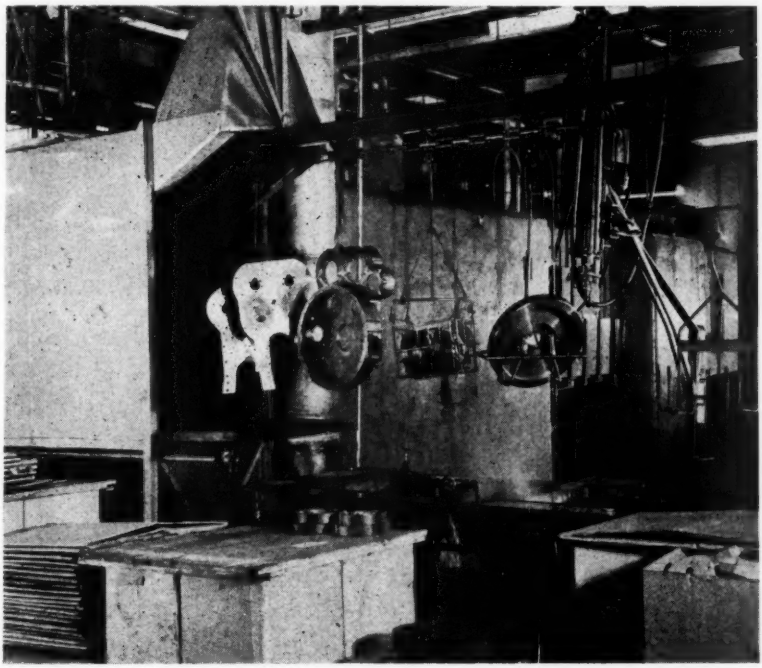

Fig. 3. Alkali washer with gravity ventilation for the control of water vapor

Gas pickling, utilizing 10 to 40 per cent hydrogen chloride at a temperature of about 1300 degrees F., is now being used for the pickling of cold rolled steel strip in preparation for galvanizing. This atmosphere is confined in a furnace through which the steel sheet passes. Any oil on the strip is burned off and the oxides are removed. It is proposed to apply this pickling method as a preparation for the coating of steel

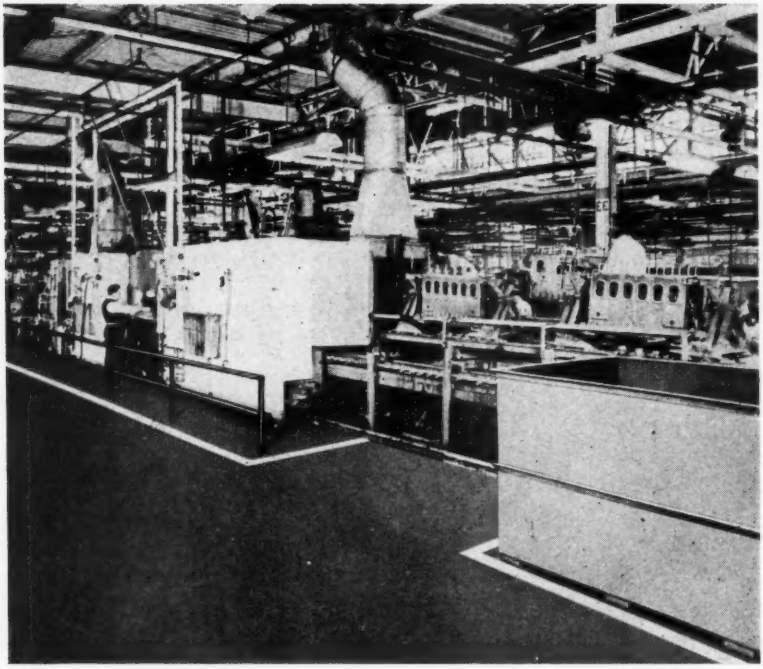

Fig. 4. Alkali washer with gravity ventilation for the control of water vapor

with tin, aluminum, and lead as well as for vitreous enameling and electroplating. Obviously, the pickling atmosphere must be effectively confined by water traps or reduced pressure, or all points of escape must be provided with effective exhaust ventilation, so as to maintain an atmosphere of less than 10 ppm hydrogen chloride in working areas. It may also be necessary to provide an exhaust hood to remove acid gas from the pickled metal after it leaves the pickling atmosphere.

Alkali Cleaning

Alkaline cleaners are used in soak tanks, dipping tanks and power washers. They may contain among other chemicals, caustic soda, soda ash, trisodium phosphate, sodium pyrophosphate, sodium hexametaphosphate, rosin, sodium resinates and other soaps, wetting agents and emulsifiers. Sometimes solvents such as orthodichlorobenzene, butyl cellosolve, pine oil or petro-

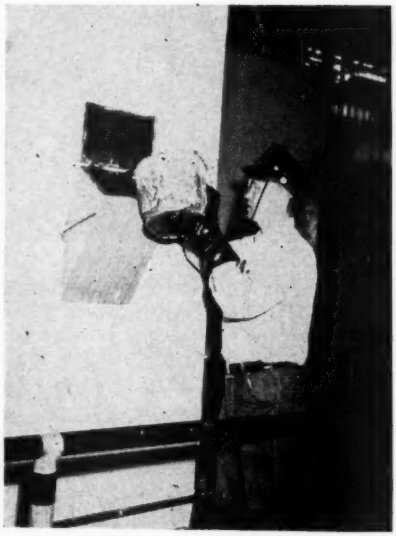

Fig. 5. Safety chute for adding caustic soda to washer

Fig. 6. Control procedure at a hot alkali wash tank

leum distillates are added. Clay may be added as a scrubber. (Figs. 3 to 5.)

In general, when no electric current is employed, alkaline baths containing no solvents other than water do not require ventilation for the control of alkali mists, except when readily attacked metals such as aluminum and zinc are being cleaned. It is, however, desirable to remove the steam from heated baths in order to avoid excessive humidity which contributes to the corrosion of metals and the discomfort of workmen (Fig. 6). In cleaning aluminum forgings in an alkali dip, it has been found necessary to provide exhaust for the alkali bath but not for the nitric acid dip which follows. This is because the caustic rapidly attacks the aluminum and a caustic mist rises from the bath, while the nitric acid bath does little more than neutralize any caustic remaining on the aluminum (Fig. 7).

The splash hazard of an alkaline bath is dependent mainly upon the temperature of the bath and its degree of alkalinity. Caustic soda gelatinizes body tissue upon contact with it, forming soluble compounds, and may produce deep and painful destruc-

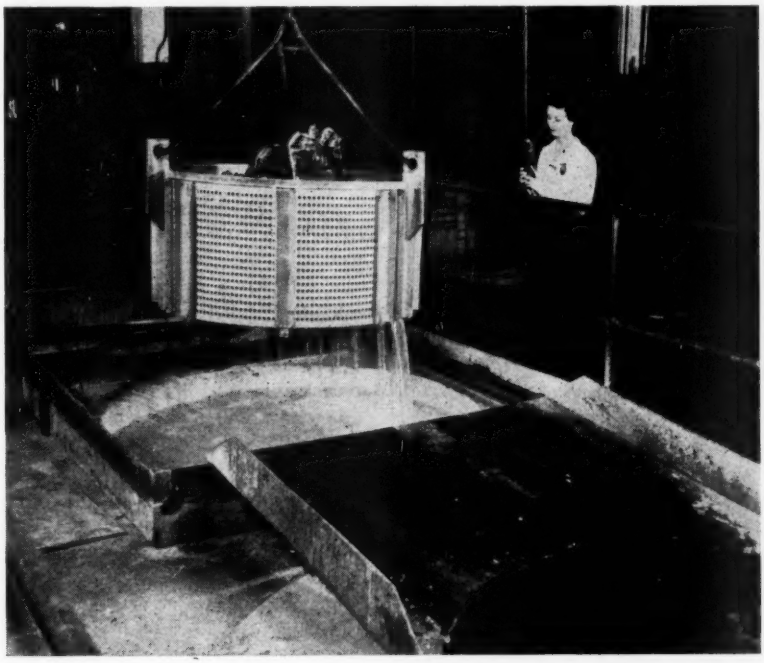

Fig. 7. Alkali wash and nitric acid dip for aluminum forgings

tion of tissue. Even the milder alkalies soften the epidermis, emulsify the skin fats and cause severe skin irritations. All soaps hydrolyze in water to produce free alkali. Trisodium phosphate is somewhat less caustic than caustic soda and is a better detergent. Its cleaning properties are improved by the addition of either tetrasodium pyrophosphate or sodium metasilicate, both of which are still less alkaline than trisodium phosphate. Paint stripping operations usually involve baths of a high degree of alkalinity. The operation lends itself well to a conveyorized machine.

Emulsion Cleaning

Kerosene Emulsions. Emulsion cleaners containing kerosene are used in soak tanks and power washers. Soak tanks at room temperature require no ventilation. Operations employing sprayed or hot emulsion cleaners should be confined and ventilated.

Emulsion cleaners containing cresylic acid, phenols, or chlorinated hydrocarbons should be provided with ventilation to prevent vapor concentrations in excess of accepted permissible limits. Skin contact should be carefully avoided, rubber gloves should be used, and the face should always be protected by a suitable shield.

Cyanide Dipping

Cyanide dips are sometimes used for the removal of tarnish or light oxide films from brass and copper. They should be operated at temperatures below 140 degrees F. and preferably with ventilation. It is of the greatest importance that they be maintained well on the alkaline side and protected from the accidental addition or accumulation of acid which might release potentially fatal concentrations of hydrogen cyanide. Overflow or drippings from the bath should not be permitted to mix with acid overflow and drippings, but should be promptly flushed away with plenty of water. Cyanide residues should not be dumped into the sewer without prior treatment.

Burn-Off

For many types of painting operations, particularly on sheet metal to be black enameled, it is possible to replace other means of oil and grease removal with a burn-off operation. This usually requires an oven heated with open gas burners to a temperature sufficient to ignite and burn any residual oil or grease film. No special problems are involved in venting the products of combustion to the exterior.

Cleaning in Molten Salt Baths

Molten salt baths for heat treating have some incidental application to the cleaning of metal. The baths should be mechanically ventilated because, at the temperature involved, the salt vaporizes slightly and produces a corrosion problem unless controlled. There is no harmful inhalation exposure, but there is a serious splash hazard if moisture enters the bath. At the temperature of molten salt, water vaporizes with explosive violence and, if accidentally introduced with the work or by other means, it may throw molten salt onto anyone nearby and inflict serious burns. Precautions should be taken to prevent water from entering the bath, and workmen should be completely protected with suitable clothing and a face shield. Automatic sprinkler systems should not be installed where they can sprinkle into the baths.

Molten Caustic Descaling

Molten caustic is used either with or without electric current for cleaning and descaling of steel alloys and cast iron. Its use, of course, is restricted to metals and alloys that are not adversely affected by caustic soda at the temperatures employed. These are usually from 680 degrees to 950 degrees F., in some instances as high as 1000 degrees F. The advantage claimed for this type of cleaning is good bond, especially with cast iron, when coating with lead, zinc, and solder of all kinds, and in brazing and vitreous enameling.

Chromium, nickel and iron oxides are removed by reduction and the metal is said not to be attacked. Oils are burned off, graphite and carbon as well as sand are removed. Oxides and possibly some of the sand collect as sludge on a sludge pan in the bottom of the bath and must be re-

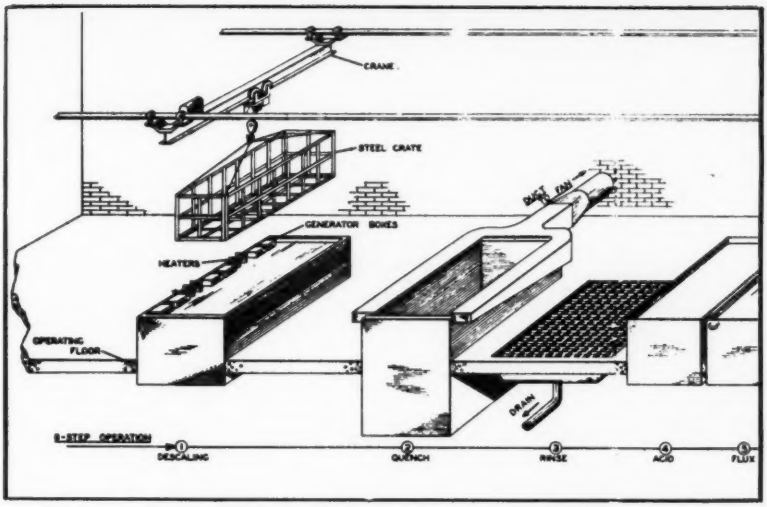

Fig. 8. Plan for sodium hydride descaling process

moved periodically. Other contaminants combine with or float on the surface of the bath or are volatilized as vapor, smoke or fume. One patented process employs an electric current through the molten caustic bath. The current is reversed during the cleaning process, it being claimed that certain contaminants are oxidized while the work is anodic and other reduced while it is cathodic. One new variation is the sodium hydride descaling process (Fig. 8) in which no current is used and sodium hydride is fed continually to the bath through the action of metallic sodium. The bath is maintained at about 700 degrees F. and metallic sodium bricks weighing 2½ to 5 pounds are added at one-half to one hour intervals to the molten caustic by admission through generator boxes suspended partially submerged along one side of the bath. Each generator box is open at the bottom and has a 6-inch covered charge port on the top.

An atmosphere of hydrogen or a mixture of hydrogen and nitrogen (cracked ammonia) or in fact any dry gas containing some hydrogen and free from oxygen, carbon monoxide and carbon dioxide, is maintained in the generator by letting the gas flow in at the bottom and out of a port at the top. The excess hydrogen is burned as it flows from the exit port. It is also burned at the charge hole in the top of the generator box during the time the sodium bricks are being added. Sodium is added in proportion to the amount of work to be descaled. The process is said to require approximately 6 to 12 pounds of sodium per ton of descaled metal. The addition is regulated so as to maintain a concentration of 1.5 to 2 per cent sodium hydride by analysis. The analysis is performed at four-hour intervals by observing the amount of hydrogen gas produced when a small, measured quantity of the bath is removed, cooled and placed in water.

The accident hazard is of more importance than prolonged exposure to the environment surrounding the operation. Obviously, in all of these processes there are the hazards connected with the use of molten caustic. The precautions mentioned before in connection with alkali baths are in order and, in addition, protection from direct burns due to splashes with the hot alkali are important. Anyone working near a bath should be fully protected by cotton clothing, including cotton gloves, and a face shield. Moisture entering the bath from any source, such as on or in the work being descaled, through leaks in the roof, leaks or condensation from overhead water

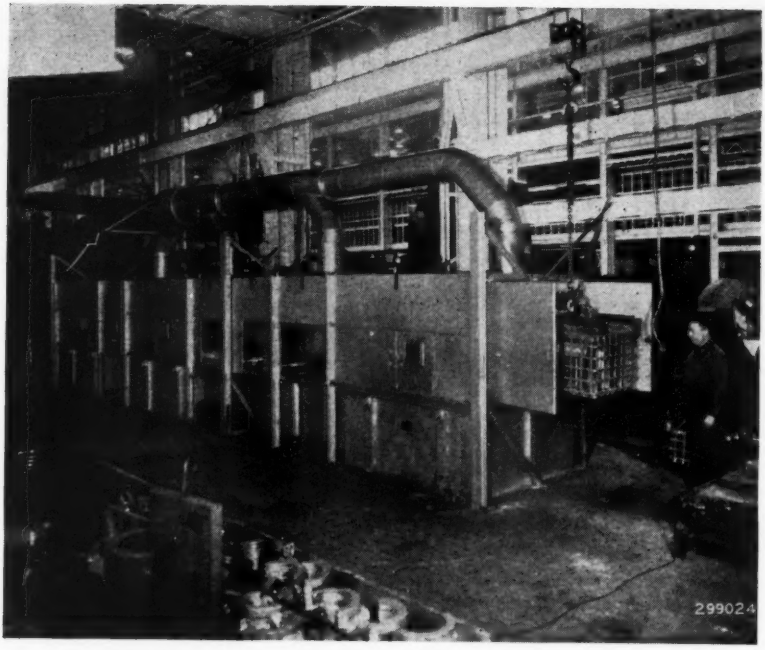

Fig. 9. Complete enclosure for molten caustic descaling bath

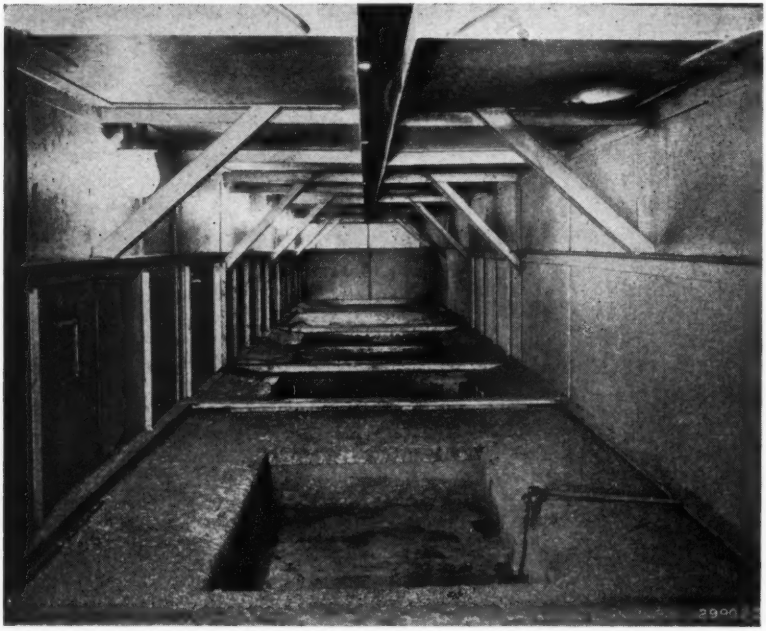

Fig. 10. Interior view of bath shown in Fig. 9

pipes, splashes from the quench bath, etc., may be vaporized with an explosive violence that can throw particles of the molten caustic a considerable distance. It is necessary to have a remote control hoist or crane to move the work, and safety shields or enclosures for the bath or for the operator are desirable as additional protection. Overhead water pipes, including automatic sprinkling systems, should be absent.

In the use of metallic sodium, great care must be exercised to keep it protected from water or moisture, and tongs should be used in handling it. It should not be allowed to stand in air where it may catch fire spontaneously but should be kept in closed containers. In the event it ignites while in the container, the fire can be smothered by merely closing the lid. If it catches fire outside the container, dry soda ash should be used to smother the fire. Fire extinguishers of the usual types should never be used as they will only intensify the danger. When sodium combines with water, hydrogen is released with such violence that the heat of the reaction usually explodes the hydrogen. Contamination of the environment resulting from the caustic bath is ordinarily not excessive since the caustic is only slightly volatile at the bath temperature. Considerable heat arises from the hot bath. Where no electric current is used and where general ventilation is good, the caustic bath may not require exhaust ventilation other than that necessary to remove any smoke or fumes resulting from oil or grease on the metal being descaled. However, it is common practice to provide exhaust for the removal of the heat and any caustic that escapes into the air (Figs. 9 and 10). The quench tank following the descaling bath requires good exhaust in order to control the steam and alkali mist. Complete enclosures with mechanical exhaust have the advantages of controlling the splash and splatter hazard as well as any caustic mist and heat exposures.

Solvent Degreasing

Cold dipping is practical to a certain extent for the cleaning of various objects including internal combustion engines and for the removal of carbon and resinous binders from pistons. The solvents may vary from a high flash petroleum distillate to a mixture that includes aliphatic and aromatic chlorinated hydrocarbons, ketones, cellosolves, creosote, and cresylic acid. No generalities regarding control can be made to apply satisfactorily, except that readily volatile or fast drying solvent should not be used without effective mechanical exhaust ventilation if workmen are to be exposed to its vapors for more than a few minutes a day. Skin contact with these materials should be avoided, and a face shield should be used to protect the eyes and face.

Under certain conditions, covered soak tanks may be used successfully without ventilation. If the tank has a water solution layer over the surface, that also serves to retard the escape of solvent vapors. Low volatility materials such as mineral spirits and kerosene, usually present no inhalation exposure during dipping, but the subsequent, widely practiced compressed air blow-off operation may produce an objectionable irritating mist unless controlled (Figs. 11 and 12).

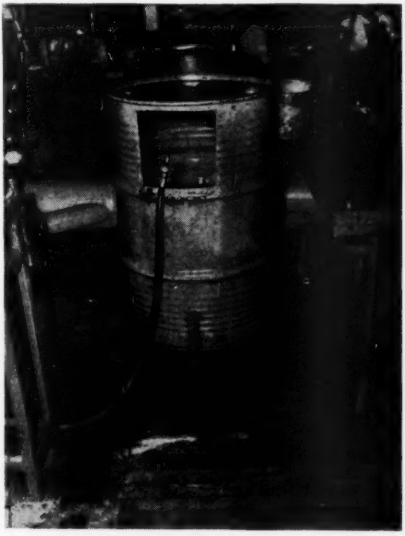

Fig. 11. Hood constructed from oil drum for control of kerosene mist from blow off small parts

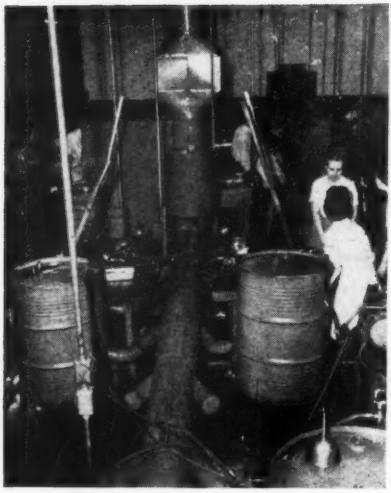

Fig. 12. View of arrangement for controlling mist at blow-off operations

Brushing or Wiping. When solvents, kept in a safety can or other suitable covered container, are applied in small amounts by brushing or wiping, the inhalation hazard far exceeds any fire hazard. It is better to use petroleum distillates, ketones and esters than chlorinated hydrocarbons where this kind of operation is found necessary. If the chlorinated hydrocarbons are found necessary to the operation, exhaust at the point of usage is preferred, unless the solvent is applied very sparingly. Soldering and brazing operations are often said to require the use of carbon tetrachloride, but in nearly all instances it has been found that with the right flux, it makes little difference what solvent is employed or whether or not any is used on the joint just before soldering.

Where work is conducted without ventilation in small rooms, vats, tanks and the like, volatile organic fluids should never be liberally applied by a swab or brush or kept in flat, open containers. If it is necessary to use volatile solvents in such situations, fresh-air hose masks should be employed for personal respiratory protection. Well-engineered ventilation is essential and both the explosion and health angles must be considered when organic liquid solvents are applied to large surfaces such as car or bus bodies.

Spraying Petroleum Solvents. Spraying with high-flash petroleum distillates such as oleum spirits, mineral spirits or kerosene, is widely employed for cleaning oils and grease from metal. Solvents with a flash point below 100 degrees F. should not be used for this purpose. The operation should always be provided with mechanical ventilation, preferably a hood as small as practicable. The exhaust should be sufficient to control any mist or vapor, for which at least 100 cubic feet per square foot of hood face is required. The hood may be of a conventional spray booth design or much smaller and may be with or without fire door and automatic extinguishers. The fire hazard attendant to the spraying of a high flash point petroleum solvent is no greater than that involved in the spraying of many lacquers and paints.

A degreasing machine (Fig. 13) is essentially a chamber in which grease solvent is kept boiling, with space above the boiling solvent for hot solvent vapors, a condenser above this for cooling and condersation of the vapor to a liquid state, and an extension of the sides above the condenser to minimize air currents inside the machine. The air space above the vapor inside a degreaser contains a vapor-air mixture which is somewhat richer in solvent vapor near the vapor line.

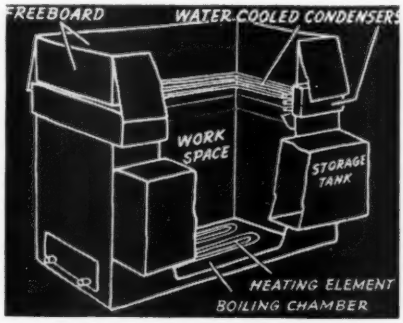

Fig. 13. Simplified plan of a degreasing machine

Degreasing machines range in size and complexity from a single chamber, hand-operated machine with a volume of a few cubic feet to a multiple chamber, enclosed

conveyor type machine in which articles may pass in turn through boiling solvent, solvent spray, condensed solvent, solvent vapor and out of the machine. They may be classified as (1) vapor degreasers, (2) immersion degreasers, and (3) spray degreasers. Any combination of the three are encountered.

In vapor degreasers, the work is lowered into the vapor above the boiling solvent, and the solvent condenses upon the cool metal surface to dissolve and wash away oil and grease films. This action should be allowed to continue until the metal reaches the temperature of the solvent vapor and becomes dry. The length of time required depends upon the size, shape, surface area, temperature, and specific heat of the parts being cleaned.

If the material is not allowed to remain long enough to reach the temperature of the vapor, considerable solvent will be dragged out with the dripping parts. Where the incentive to keep production costs down does not discourage this practice, the preservation of health makes it necessary to provide a mechanically exhausted grid upon which to place the material as it is taken from the degreaser. Vapor action alone, since there is no mechanical cleaning, may not be suitable for the removal of heavy contaminants or matter not dissolved by the solvent. Also, thin gauge metal with large ratio of surface to mass is heated so rapidly by the vapors that there is insufficient time for thorough cleaning. The method is especially adapted to complete removal of thin oil or grease films since only pure distillate free of oil contamination condenses on the work.

Where articles have intricate shapes or are heavily contaminated with dirt and grease, immersion in boiling solvent provides not only prolonged solvent action but also mechanical scrubbing by the boiling liquid.

Where insoluble matter is of such a nature or extent as not to be removed by immersion in boiling solvent, spray degreasing may be necessary. In this case, the work is first lowered into the vapor to remove oil and grease, then pressure sprayed with warm solvent, and finally given the vapor rinse which is indispensable for the removal of all traces of oil and grease.

In order to conserve solvent and preserve health, it is essential that any spraying be done below the vapor level of the degreaser in such a manner as not to disturb the vapor level, and that baffles or screens be placed so as to prevent the rebound or ricochet of droplets of solvent into the area above the vapor level. This is rather impractical with a hand-operated spray. For that reason, hand spraying is to be avoided or held at a minimum.

All of these methods are applicable to either hand-operated or conveyorized machines. Where the work is of sufficient quantity to justify the cost, conveyorized equipment is more satisfactory in that solvent loss with its possible harmfulness to health is easier to control.

(*To Be Concluded in September Issue*)

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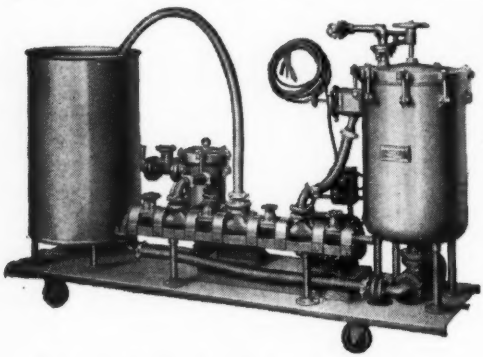

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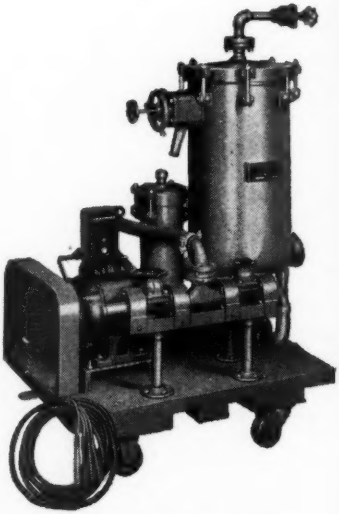

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Abstracts of Papers

Presented at the 33d Annual Convention

(Concluded from July Issue)

Practical Facts about Polishing and Buffing Compounds, by Howard J. McAleer Formax Mfg. Company.

Polishing with coated resilient wheels or abrasive belts serves to remove surface imperfections by a cutting action. Buffing with flexible buffs charged with buffing compound has a very light cutting action and a burnishing action both probably partially associated with chemical reaction between the fatty acids in the buffing compound and the metal being buffed.

Buffing compounds contain either grease binders (animal tallows, vegetable waxes, petroleum products) or animal hide glue, so called greaseless compounds.

The nature and action of the abrasives as well as the grease binders are described. The effects of the latter in subsequent cleaning operations are shown.

There is a short discussion of liquid buffing and polishing compounds which are claimed to cut material and labor costs and increase the output per operator. These compounds are easily removed by cleaning.

●

Resins of the Vinyl Family in Metal Finishing, by Fremond L. Scott, Organic Coatings Division, United Chromium Incorporated.

Vinyl resins are thermoplastic and have a linear carbon to carbon structure which is formed more slowly and hence has greater chemical stability than, for example, thermosetting resins—alkyd, phenolic, urea and melamine—which exhibit rapid, three-dimensional growth. The modifying radicals may supply outstanding chemical resistance if they are chlorine or attached through a carbon to carbon bond. This is the case with vinyl chloride, vinylidene chloride, polystyrene and the methacrylates. Where the bond is an oxygen to carbon linkage, the resistance is less, as in the case of vinyl acetate, vinyl alcohol and vinyl butyral.

The uses of the vinyl resins in the metal finishing industry are classified as follows: (1) functional use in electroplating—rack coatings, stop-off lacquers, tank linings, shields and insulating blocks; (2) protective use in maintenance of equipment—coatings for tanks, exhaust hoods, concrete floors, plaster walls, and piping; (3) decorative or protective use as coatings on finished articles—permanent and temporary. The varied requirements for these different uses are set forth.

To meet them, copolymers of the several base materials are used, commonly with modifying resins, plasticizers, solvents, pigments, and other compounding ingredients. Tables of properties are appended.

●

Strippable Spray Type Coatings, by E. H. Bucy, Zapon Division, Atlas Powder Company.

A detailed description of the application of easily removable, highly protective films, employed during the war to seal off Army and Navy equipment for shipping and after the war to maintain such equipment in good condition during semi-permanent or permanent storage.

Possible civilian applications include: protection of powder and explosives; prevention of static electricity and metallic contamination from handling equipment for dry materials; sealing of beverage and chemical reagent bottles and carboys dur-

ing transit; use as simulated leather handles on sport equipment; packaging and storage of jigs and fixtures.

•

Natural and Synthetic Rubber in the Electroplating Industry, by H. C. Klein, Industrial Products Sales Division, The B. F. Goodrich Co.

The pound price of natural rubber reached an all-time high in 1910 of $3.12, an all-time low of 3 cents in 1932. By 1937 it had climbed back to 27 cents, and captured stocks after the end of the war sold at the war-time price of 22 ½ cents.

The United States can now produce at least 500,000 tons of synthetic rubber for sale at the established price of 18½ cents. If high cost plants are included, the productive capacity is in excess of 1,000,000 tons yearly against a total U. S. rubber consumption in 1940 of 650,000 tons. The total world natural rubber production is estimated at less than 600,000 tons in 1946 and 900,000 tons in 1947 against an estimated world consumption of rubber of 1,500,000 tons.

At the time of Pearl Harbor, tank linings were practically 100 per cent natural crude rubber construction with a small amount of Neoprene and Koroseal being used. From November 1st, 1943 to November 1945, only 10 per cent (including repair material and cement) were natural crude rubber, the remainder synthetic rubber, mostly Buna S and small amounts of Neoprene and Butyl rubbers.

In contrast to soft synthetic rubber, soft natural rubber protects itself against hydrochloric acid by forming a hard rubber hydrochloride film. Buna S and Buna N, however, can be made into semi-hard and ebonite types of linings which are equal to the semi-hard and ebonite types made of natural rubber. Weak sulfuric acid solutions do not affect even the soft natural rubbers.

Buna S is most generally available but not oil resisting. Semi-hard grades are suitable for most other purposes.

Neoprene is a special purpose rubber with good oil resistance and is superior to other rubbers except Butyl for strong hydrofluoric acid solutions. It is excellent for steel mill roll coverings.

Buna N is difficult to handle as a lining material. Hard Buna N pipe shows excellent promise for handling corrosives up to 200–250° F.

Butyl shows good possibility as a special purpose lining for water-white phosphoric acid and resists nitric acid better than natural soft rubber. It cannot yet be economically handled as a tank lining material.

Thiokol is not as good as some other rubbers as far as acid or alkali resistance is concerned, but has excellent resistance to solvents and gasolene.

Vinyl type rubber-like coatings are excellent special purpose linings for bright nickel, silver and even chromium plating solutions, show low absorption, and are easily repaired in the field.

•

Parkerizing—Growth or Shrinkage, by N. A. Tope, Coventry, England.

The dimensional change produced with the Parker "A" process in the effective diameter of threaded components of an S.A.E. 3325 steel may vary between —0.001 inch and + 0.004 inch according to process conditions. Coarsely crystalline coatings are indicative of large + values and are formed with acid etching and alkali cleaning of the steel or with much sludge dispersed in the bath and settling on the work.

It is recommended that the steel be prepared by trichlorethylene degreasing followed by seven minutes in a suitable wetting agent solution such as a 1¼% solution of Lissapol Paste (sodium salt of oleyl p-anisidide) manufactured by Imperial Chemical Industries, or by at least 20 minutes in boiling water.

There is an equilibrium between the rates at which sludge dissolves in the bath and gravitates to the bottom of the tank

which determines the magnitude of the dimensional changes.

To keep the effect of sludge at a minimum, turbulence should be kept low by (1) unhurried insertion and withdrawal of the work and minimum shaking during processing, (2) holding down convection and ebullition, (3) having a large solution volume per processed surface area, (4) changing coils (brass preferred to steel) or retrieving parts dropped in the tank only when it is not in use. Small parts are best processed in barrels riding high in the solution.

Other chromium-nickel steels and plain carbon steels behave the same. Ferrous phosphate and zinc phosphate types of solutions have the same effect.

●

Some Observations on Alkaline Electrotinning, by T. G. Timley, Jones & Laughlin Steel Corporation.

Independent of the electrolyte used, all tin plate manufacturers find that at times two apparently comparable lots of strip may differ in corrosion resistance. While the answer has not yet been found, it has been noted that (1) alkaline electrocleaning is beneficial, (2) rather heavy pickling helps, (3) normalization of the steel prior to processing is superior to the usual annealing, and (4) continuous annealing affects an improvement. It is concluded that the earlier stage of tin plate processing prior to heat treatment should be re-examined.

When the caustic soda content is held at 30–35 g/l, an equilibrium tin content is reached of 45–55 g/l at 190–200° F., suitable for strip widths of 22–35 inches.

Losses from leakage, entrainment, stop-over and drag-out may be surprisingly high.

An ideal anode should have at least the following characteristics: (1) maintain fairly uniform area during its useful life, obtained with a high ratio of width and length to thickness; (2) permit operating control of the filming operation, possible with a surface contour that favors an even current distribution; (3) give uniform current distribution on the anode for maximum permissible current density operating range, conditioned by anode design; (4) give uniform coating distribution on the strip, again conditioned by anode design; and (5) be mechanically sound through freedom from cold shots, shrinkage cracks and pipe, best obtained with horizontal casting in open top molds.

The conventional flat rectangular anode has served well. The flat slab, keystone type shows more crowding of current lines (abnormally high current density) at the bottom. The flat slab, inverted keystone type has a larger area of uniform current density in its center than the keystone type. The flat slab with rounded edges shows freak current lines. The elliptical anode is impractical because of its high weight and the large tank space required. The elliptical finger type and the corrugated anodes give too uneven a current distribution for film maintenance.

Proposed means for minimizing the edge effect on anodes are (1) shielding, (2) application of stop-off lacquer, (3) making a number of the anodes narrower than the rest and transversely adjustable to strip width.

The edge effect on the strip is reduced by making the anode very narrow or very wide.

●

Electrotin Plating of Wide Strip at High Speed, by Samuel S. Johnston and Garold C. Jenison, Weirton Steel Company.

Following a historical review of the development of the tin plate industry, the authors point out that continuous electrotinning of strip draws heavily on the recently developed art of manufacture and handling of continuous steel strip and on the plating of sheet metal.

A pilot plant installed in 1938 served as the basis for the present commercial lines which are designed for a strip speed of 1000 feet per minute, a maximum band width of 38 inches, a strip gage of 0.008–0.035 inch, a coating weight of 0.5 pound tin per base box at 225 amperes per square foot, with uncoiling and recoiling reels capable of handling coils weighing up to 30,000 pounds each.

The steps are: (1) alternate cathodic and anodic cleaning at 100 to 150 amperes square foot with the strip bipolar between first a pair of anodic grills, then a pair of cathodic grills, repeated once, each grill being 42 inches long; (2) following wringer rolls which return the dragout to the cleaning tanks, the strip is scrub rinsed with high-speed rotary tampico brushes and high pressure sprays; (3) pickling in 4–8 percent by weight sulfuric acid depending on the grade of steel (no inhibitor used) at 180–190° F. in 65 feet long tank; (4) same as (2); (5) plating in an 80-foot long triple-deck machine, in which the bottom of the strip is plated in the first deck, the top in the second. Each deck has 12 plating cells 1 foot in depth, with each cell connected to a 5000 ampere, 12 volt motor-generator. The duPont Halogen tin bath is continuously pumped from a 15,000 gallon storage tank to the cells and allowed to overflow back again at the entry ends. Anodes, 30″x3″x3″ are placed underneath the strip and rest on a main anode support of tin in the middle and rubber-covered auxiliary supports at the ends. Between each cell the strip is tightly pressed by a rubber covered roll against a steel roll from which the current is taken by carbon brushes in commutators at both ends. The current changes automatically with the line speed and a master control compensates for variations in the internal resistance of the individual cells; (6) spraying with solution from the drag-out tank and "wringing"; (7) on the third deck, drag-out recovery in solution slightly acidified with sodium bifluoride to prevent hydrolysis of stannous tin; (8) water spray; (9) leaving the plating machine, the strip is dried; (10) the tin is melted in a 200,000 cycle, 17,000 volt inductive field which is electronically controlled, then quenched; (11) cathodic treatment at 10–40 amperes per square foot and then immersion treatment in alkaline chromate solution; (12) thorough washing with condensate; (13) treatment in a cotton seed oil-air fog to deposit 0.1–0.2 gram oil per base box.

Electropolishing—It's Commercial Aspects Today, by Charles L. Faust, Battelle Memorial Institute.

This paper begins with a historical review which starts with German patent No. 225,873 (1910) to E. Spitalsky who employed an alkaline cyanide bath for the electropolishing of silver and silver plate. A very valuable table of not less than 40 U. S. and 37 foreign patents shows the progress which has been made, largely since the early 1930s.

Advantages of the processes are: high lustre and brilliance of exceptionally attractive tone over the whole surface of an article, including the recesses; partial substitution for scarce polishers and buffers as well as hard to get polishing wheels and buffs; replacement of mechanical methods for machining to exact size and deburring.

Limitations include: necessity for having a surface substantially free from seams, dirt, slag and non-metallic inclusions, deep drawing or rolling lines, and certain insoluble alloy phases if a mirror-like surface is desired; inapplicability to removal of major surface roughness exceeding that obtained with a well-dressed 180-grit wheel.

The possibilities of sand blasted and electropolished surfaces of satin appearance and of combination wheel and electrolytic treatments are stressed.

A list of actual applications is given and illustrated. Electropolishing of stainless and other alloy steels, carbon steels, gray nickel plate, copper and brass, monel and nickel silver, aluminum, zinc, cadmium plate, silver, lead and tin and their alloys, and magnesium is discussed in considerable detail. A passivating effect as a rule retards tarnishing.

Equipment requirements are listed and cost estimates are given.

●

Characteristics of Certain Plastic Films and Coatings, by J. R. Shackleton, Plastics Department, E. I. du Pont de Nemours & Company.

A discussion of certain plastics of special interest to the electroplater.

Polythene (polyethylene) may be molded or extruded to give tank lining material. It is employed as a coating material in the form of a hot solution (>176°C) in chlorinated hydrocarbons and other solvents, a low viscosity melt (>300° F), a powder which can be flame sprayed, or a water emulsion baked after application. Properties include low specific gravity of 0.92; negligible water absorption of 0.005 per cent; low moisture-vapor transmission (graph attached); high chemical resistance to organic solvents at room temperature and to acids and alkalies, including strong oxidizing and reducing agents; flexibility even at very low temperatures; freedom from odor and taste; non-toxicity; high impact strength and tear resistance; power factor of 0.003 and dielectric constant of 2.3; tensile strength of about 1900 psi; service temperature of up to 180° F with high form stability; can be heat sealed to itself and to metal; compositions with good adhesion to glass and copper have been developed; relative softness; abrasion resistance not high; fair toughness and resiliency.

Lucite (acrylic resin) is used as insulators, chromium spray reducer and liners in tumbling barrels for alkaline solutions at 140° F. It has high impact resistance, does not become brittle at low temperatures and can be easily repaired with commercially available cements.

Nylon (polyamide resin) resists many organic solvents but is attacked by acids. Although a thermoplastic, its service temperature may reach 300° F.

Tefton (polytetrafluoroethylene) is not attacked by any known corrosive chemical, either hot or cold; is stable between −70° F. and +500° F; has a power factor of 0.0002 and a dielectric constant of 2.0; has excellent machining qualities. It requires very special techniques for compression molding and cannot be put into solution for coating purposes. Being a very new development, its general application awaits results of further research.

GUSTAF SODERBERG, *Editor.*

A. S. T. M. ANNOUNCES MEDALISTS

The authors of three outstanding technical papers presented at A.S.T.M. meetings or published by the Society were recognized at the A.S.T.M. annual meeting in Buffalo, June 24 to 28.

The Charles B. Dudley Medal, recognizing a paper of outstanding merit constituting an original contribution on research in engineering materials, was awarded to H. R. Copson, Research Chemist, Research Laboratories, the International Nickel Co., Inc., Bayonne, N. J., for his 1945 paper on "A Theory of the Mechanism of Rusting of Low Alloy Steels in the Atmosphere."

It was announced that R. C. Brumfield, Department of Mechanical Engineering, California Institute of Technology, was to receive the first Richard L. Templin Award but the actual presentation is to be made in Los Angeles at a later meeting of the A. S. T. M. District there. This award, the purpose of which is to stimulate research in the development of testing methods and apparatus, to encourage the presentation to the Society of papers describing new and useful testing procedures and apparatus, and to recognize meritorious efforts of this kind, was given to Mr. Brumfield for his paper in the 1945 Proceedings, covering "A Sulfur Print Method for the Study of Crack Growth in the Corrosion-Fatigue Metals."

The Sanford E. Thompson Award, sponsored by the Society's Committee C-9 on Concrete and Concrete Aggregates, recognizing the author of a paper of outstanding merit on concrete and concrete aggregates presented at an A.S.T.M. meeting, was awarded to C. W. Muhlenbruch, Associate Professor of Civil Engineering, Carnegie Institute of Technology, for his paper on "The Effect of Repeated Loading on the Bond Strength of Concrete," published in the 1945 A.S.T.M. *Proceedings.*

JOB PLATERS MEETING

One of the outstanding events at the recent Pittsburgh Convention was a dinner meeting of job platers held on Tuesday evening, June 18th, at the Hotel William Penn. It was attended by eighty-eight platers from all parts of the United States, from California to New York. Edward J. Musick of Musick Plating, Inc., St. Louis, presided in the absence of R. J. O'Connor of the Contract Plating Works, Bridgeport, Connecticut, who was unable to attend because of illness.

The official business was divided into two sections: first a report by Adolph Bregman of New York which reviewed the progress of the job plating industry during the past year and, second, a report by Raymond M. Shock of Detroit on a proposed national association.

Mr. Bregman stated that during the past year, the industry as a whole had prospered, but was faced with a number of postwar problems such as a shortage of skilled polishers and miscellaneous plating materials, especially buffs and silver. He also mentioned cadmium and chromium chemicals as being materials hard to obtain.

Mr. Shock outlined a plan for the formation of a National Association of Metal Finishers to include platers, enamelers, and rustproofers. After extended discussion, it was voted to proceed with the organization and to set dues on a graduated scale based upon the capacity of the member firms. The National Association will be composed solely of local groups in various parts of the country and individual firms will join their nearest local association.

Another meeting was held the next morning by the Steering Committee at which ways and means of organization were agreed upon. At the present time, local associations are functioning in New York, Detroit, Boston, Chicago, Los Angeles and San Francisco. The National Association will aid in the formation of new local groups as quickly as possible.

One of the local groups to be formed will cover the Mississippi Valley, including in its territory Missouri, Kansas, Oklahoma, Texas, Louisiana, Arkansas, Western Kentucky, Tennessee and Southern Illinois. The prime mover in this organization will be Edward Musick of St. Louis. A Past President of the American Electroplaters' Society, a Past Chairman of the job platers' meetings at the National Conventions, and one of the best known job platers in the United States, he will have an influence which will undoubtedly be effective in the difficult task of organizing this broad group.

All platers in the territory described above are asked to communicate with Mr. Edward J. Musick, Musick Plating Inc., 206 South 9th Street, St. Louis, Missouri.

The objects of the National Association are to promote the general welfare of its members, especially as it pertains to matters affecting management, labor relations, legislation and taxes.

Convention Note

The following committees were appointed by Past President W. L. Pinner and served during the Pittsburgh Convention.

Installation Committee—F. C. Mesle, *Chairman*, John Feeley and William Neill.

Law Committee (per Constitutional provision)—W. L. Pinner, *Chairman*, Past Presidents.

Auditing Committee—Charles C. Conley, *Chairman*, William McConas and E. T. Candee.

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FURAN RESINS
In the Plating Industry

By WILLIAM H. ADAMS, Jr.

Haveg Corporation, Newark, Del.

Most electroplating operations involve solutions of corrosive salts and other chemicals which, by their very nature, make the selection of the proper materials of construction one of the most serious problems of the electroplater. He must provide treatment and storage tanks, pipe, fittings, valves, pumps and other items which not only will resist corrosion, but which also will not contaminate the solutions. Furthermore, such tanks and other equipment should be electrical non-conductors in order to avoid electrolytic side-reactions and destruction by spray currents.

These conditions are admittedly very difficult to meet. Numerous materials of construction have been proposed and used from time to time.

One such material of construction with which most electroplaters are undoubtedly already familiar, consists of phenol-formaldehyde resin, compounded with a special acid-resisting asbestos and molded, by a process which eliminates presses and expensive molds, into full commercial size rectangular or cylindrical tanks, pumps, pipe and fittings, valves, etc. Since it is a solid self-supporting mass of plastic material, the chemical resistance is not a surface condition but exists throughout the whole structure. The material itself is rigid and strong, and is affected neither by rapid temperature changes nor by sustained temperatures up to 300 degrees F.

From a study of the properties, it becomes not at all surprising that such tanks and other equipment have been widely used for many plating operations. These include copper plating from copper sulfate baths such as commonly used in electrotyping, and electrolytic purification of silver with a silver nitrate bath. Other satisfactory operations include acid tin and acid zinc plating, palladium plating from an acid chloride bath, iron plating from chloride or sulfate baths, and other similar applications.

It will be quickly noted that all of these solutions are on the acid side, most of them being strongly acid. Phenol formaldehyde resins give excellent resistance to acids. Their resistance to strong alkalies, however, is very poor, and consequently the equipment could not be employed for the many plating operations involving the use of strong alkalies until resins resistant to them were developed.

Numerous attempts along these lines have been made, but it was not until the last two or three years that a significant commercial development in the field of the so-called furan resins made it possible to produce equipment which could be used equally well in either acid or alkaline service and which could, therefore, serve for the many plating operations in which cyanides, sodium carbonate, caustic soda or other alkalies are employed. The furan resins are actually among the most resistant plastics yet known. They combine physical properties of a very high order with resistance to acids, alkalies, salts and solvents, far beyond the possibilities of the phenolic resins.

The new material based on furan resin utilizes the same designs as the earlier material and can be produced in the form of cylindrical and rectangular tanks, pipe and fittings, valves, pumps, etc., as before. It has been tried out, not only with baths containing simple acids and alkalies, but also with many of the new and complex proprietary bright nickel solutions. With these it has been found to be satisfactory

from the standpoints of both corrosion and contamination of the solution. As a matter of fact, about the only common plating solution which is unsatisfactory for use with either the old or the new grade is chromium plating solution. The chromic acid is highly oxidizing in nature and readily attacks both phenolic and furan resins so that neither can be used satisfactorily in the presence of appreciable concentrations.

It is rather curious to realize that while the commercially successful development of furan resins is very recent, the resins themselves have been known for a long time. Certain modifications were developed originally by Trickey and Miner[1] who pointed out that either furfural or furfuryl alcohol could be condensed to form resins.

most of the reactions. Some are so exothermic that under certain conditions the temperature rises suddenly and beyond any possibility of control, the reaction actually becoming dangerously explosive. Anyone who has worked seriously with these resins has spots on his laboratory walls and ceiling which provide permanent memorials to certain batches!

In order to develop such resins to their optimum value in commercial quantities, it was necessary, therefore, to develop distinctly unconventional control methods. This proved to be a tedious and difficult problem, especially since each successive increase in the size of the batch introduced new "bugs." It was finally solved, however, and now batches of several thousand pounds

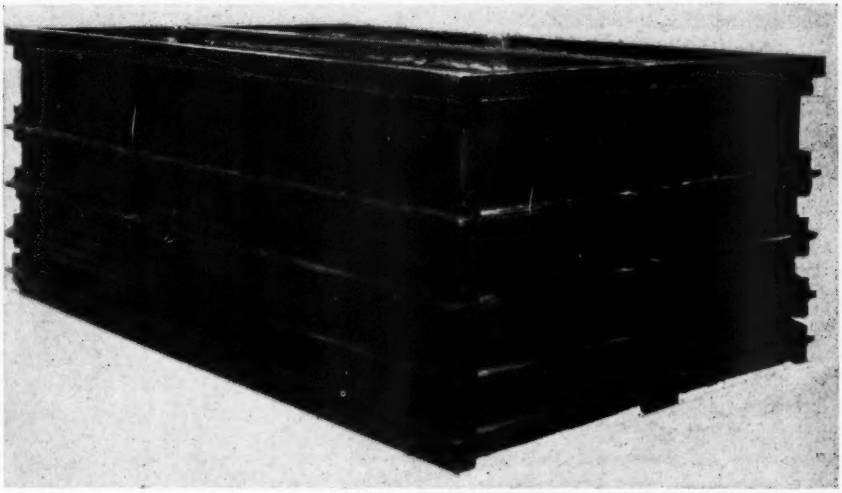

Fig. 1. Tank made with furan resin

More recently, Harvey[2] has done considerable work with resins of this type. Other investigators[3, 4, 5, 6] have also been interested in resins of this general type, but only for specific and mainly fairly small scale developments.

At first thought, it may seem very strange that resins with such potentially valuable commercial properties should have been neglected so long by the industry. As a matter of fact, there were several very good reasons for this, the most important one being the really extraordinary violence of

can be made with full certainty of uniform results.

In manufacturing material from furan resins, it is fortunate that no major changes in technique or equipment were necessary. The resin fitted into present manufacturing processes without major changes; adjustment of cycles and similar details being all that was required. Thus it is possible quickly and easily to change from one grade to another with the same equipment without complications or difficulties. As a matter of fact, both grades can be and are regu-

larly manufactured at the same time.

Physically, the material made from furan resin is quite similar to that made from phenolic resin. It has the same rigidity, toughness and strength and is, in fact, slightly superior in many respects. Table I presents average physical properties of both materials.

TABLE I

PHYSICAL PROPERTIES OF HAVEG MATERIALS

	Haveg from Phenol Resin	Haveg 60 from Furan Resin
Tensile strength, psi.....	2,500	2,800
Compressive strength, psi	10,500	10,800
Flexural strength, psi....	5,600	6,200
Shearing strength, psi....	3,500	6,800
Mod. of elasticity (flex)..	470,000	530,000
Rockwell Hardness.....	115	115
Specific gravity.....	1.60	1.75
Impact strength.....	0.51	0.77
Loss of strength at 100° C.	15%	20%

The furan resins, like the phenolics, are non-conductors of the electric current and there is no danger of damage from stray currents, etc. Of course, they are not intended for high tension radio frequency insulation. For such uses, conventional laminated materials should continue to be employed.

Chemically, the properties of the furan resins which are of the greatest interest to the electroplaters are their extremely high resistance to acids and alkalies. This double resistance permits the use of the material in almost any type of bath, except chromic acid as has been noted above.

In the chemical process industry, the resistance of the furan material to solvents is perhaps of as great interest as its acid and alkali resistance. There seem to be scarcely any solvents which it will not resist. This fact is probably of minor interest to the electroplater as he seldom uses solvents to any great extent.

The furan base material is not very resistant to oxidizing agents, being very similar to phenolic resins in this respect. It will not resist the strongly oxidizing action of a chromic acid pickling bath, and should not be used with stronger than 50 per cent sulfuric acid. In the case of nitric acid, general recommendation cannot be given, but the phenol-formaldehyde material has been used for many years with silver nitrate baths containing a small amount of nitric acid. Large concentrations would, however, be almost certain to cause trouble.

In conclusion, it should be stated that the value of furan resins to the electroplater lies in the fact that equipment can be made from it which will resist the corrosive effects of practically every plating solution except chromium. Such equipment, including tanks, pumps, pipe and fittings, valves, etc., make it possible to avoid completely the danger of damage by corrosion.

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[1] J. P. Trickey and C. S. Miner, U. S. Patent No. 1,665,233-7.

[2] M. T. Harvey, U. S. Patent No. 2,343,972-3, No. 2,383,790 and No. 2,383,792; M. T. Harvey and R. F. Durst, U. S. Patent No. 2,383,793.

[3] E. Korten, U. S. Patent No. 2,321,493.

[4] L. T. Richardson, U. S. Patent No. 1,682,934.

[5] E. F. Kiefer, U. S. Patent No. 2,174,886-7.

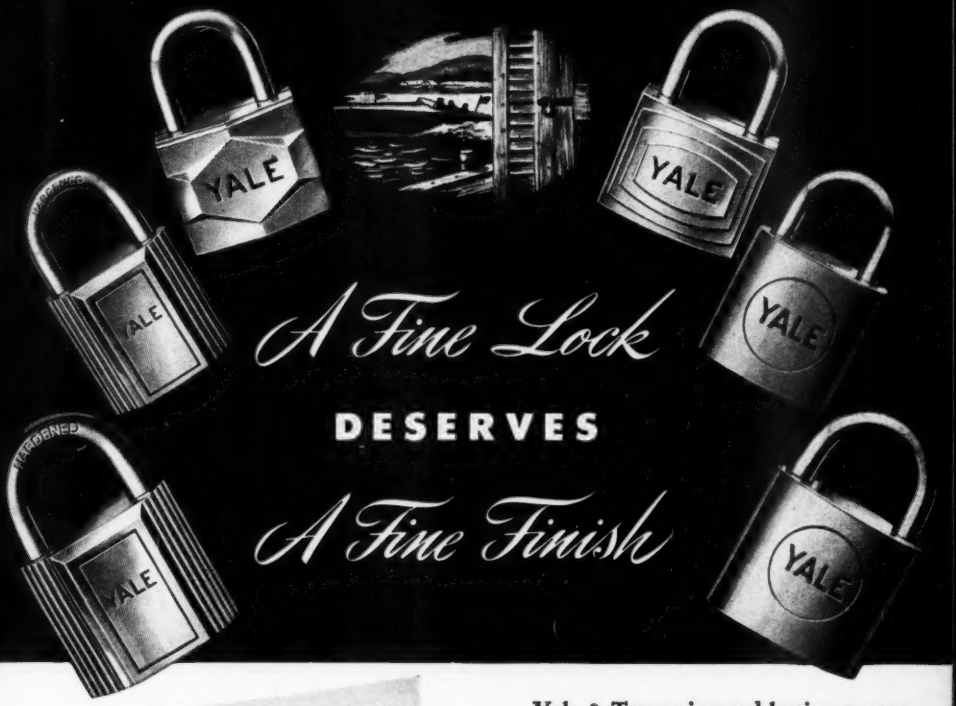
[6] H. F. Lewis, U. S. Patent No. 2,267,830.

ANNUAL ELECTRONICS CONFERENCE TO FEATURE TECHNICAL PROGRAM

The Second National Electronics Conference will be held October 3, 4, and 5 at the Edgewater Beach Hotel in Chicago. Dr. E. U. Condon, Director, National Bureau of Standards, Washington, D. C., will be the keynote speaker.

The technical program will comprise approximately 50 papers on communications, radar, television, industrial electronics, instrumentation and theoretical research. Emphasis will be placed on the frontier type of paper, representing the latest in scientific and engineering developments.

Exhibits of electronic equipment, including the latest commercial developments, will be a feature at this year's Conference.



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Past President Missing

Anyone who knows the whereabouts of Mr. Walter Allen, a Past President of the Society and a former member of the Grand Rapids Branch, please notify the Secretary's office, P. O. Box 168, Jenkintown, Pa.

DETERMINATION OF IMPURITIES IN ELECTROPLATING SOLUTIONS

I. Introduction

A. E. S. Research Project No. 2

By D. GARDNER FOULKE *(CHAIRMAN)*
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Acknowledgement is due the Research Committee, Mr. E. C. Candee, American Brass Company, Chairman, the Research Directing Sub-Committee, Dr. R. M. Wick, Bethlehem Steel Corporation, and Dr. Louis Weisberg, Consulting Chemist, New York City, Chairman and Vice-Chairman respectively, for their contribution to the project.

This project is now being carried out at Lehigh University, Bethlehem, Pa., by Professor E. J. Serfass, Project Director, and W. S. Levine, Associate.

Discussion of Colorimetry

The methods for the determination of impurities in plating baths were adopted as the result of both literature search[1, 2] and laboratory research. In each case, all available methods were considered, but it was early apparent that the determination of impurities made such demands that the ordinary types of volumetric or gravimetric methods either failed or were unduly involved. This was true because the order of magnitude of the concentration of the impurity might vary from several parts per million, or milligrams per liter, to a hundred or more parts per million. In a sample of ten milliliters, the amount of impurity was of the order of ten to thirty micrograms or gammas. Colorimetric methods were ideal for these determinations and as a general rule such methods have been developed. Consequently, it is believed that a short discussion of colorimetry is in order to clarify the experimental data to be reported later.

Colorimetric methods depend upon the principle that the color intensity of a solution due to the presence of a colored constituent is directly proportional to the concentration of that constituent. When a beam of light is passed through such a solution, the relationship between the incident and transmitted light (monochromatic) in terms of the con-

centration of the colored substance is as follows:

$$I/I_0 = 10^{-kcb}$$

in which

I_0 = intensity of the incident light beam

I = intensity of the transmitted beam

k = a constant dependent upon the solute, the solvent, the temperature and the wave length of the light

c = concentration of the colored substance

b = depth of solution traversed by the light

This relation is known as the Lambert-Beer law and may be expressed as:

$$\text{Log}_{10}\, I_0/I = kcb$$

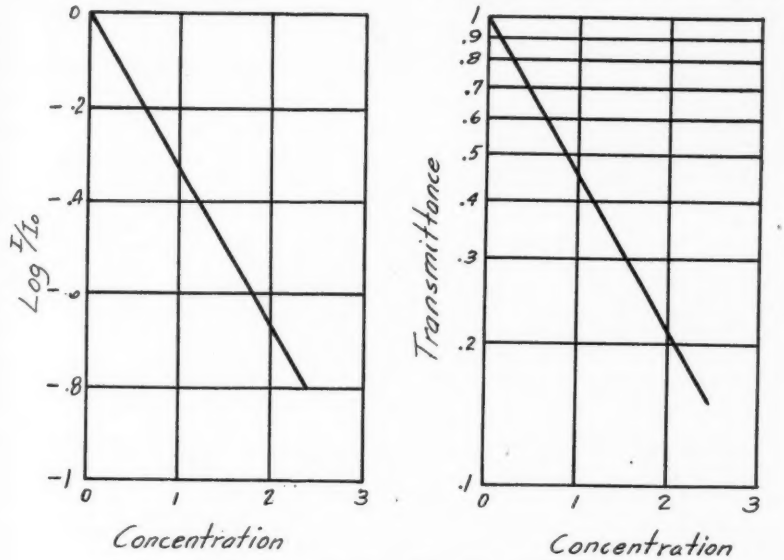


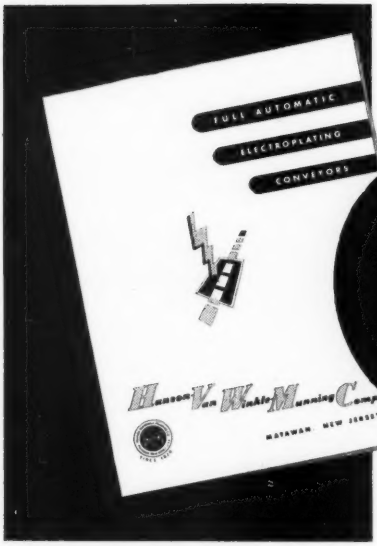
Fig. 1. Forms of graphs for determination of impurities.

Log I_0/I is known as the extinction or optical density of the solution and is expressed as E or D depending upon the author. E/bc or D/bc is designated as the extinction coefficient. Its numerical value depends upon the unit in which the concentration is expressed. With the concentration in moles per liter and the thickness of the cell through which the light is passed equal to 1 cm, the value for k is known as the molar extinction coefficient and designated as K.

I_0/I is called the transmittancy T of the solution. $I/I_0 \times 100 = \%T$ is the per cent transmittancy. From the above equation, it is obvious that when the value k has been determined for one known concentration in solutions where Beer's law applies, it is possible to determine any other concentration by measuring the transmittancy of the solution. In reality it is safer to plot several values for the logarithm of the transmittancy versus known concentrations. This may be accomplished directly by means of semi-log graph paper and results in the usually straight line curve shown in Figure 1. This graph is then used in the determination of the unknown.

The formulae given above are limited by three conditions: (1) the incident light should be measured through a blank; (2) the incident light must be monochromatic; (3) the concentration range must be restricted. A discussion of the methods which are employed for the measurement of transmittancy will show how these restrictions are met.

Visual color comparisons can be made in many cases with considerable accuracy and such methods will be adapted for "in-the-shop" analyses. However, instruments designed to utilize photo-cell response are much more convenient and accurate. Al-



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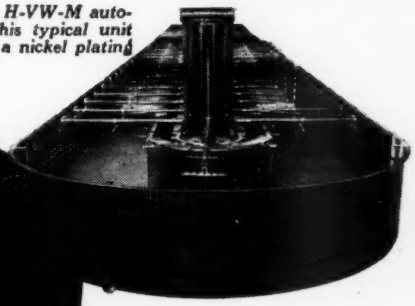

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though technical details, electrical circuits, etc. of the various instruments are beyond the scope of this paper, a general description of such instruments is in order.

The simplest form of electrophotometer would consist of a monchromatic source of light A, directed by means of a slit and lens L through an absorption cell B, after which the radiant energy would impinge upon a photocell C. Finally some means for measuring the photocell response such as a galvanometer or microammeter D is required. This is shown in Figure 2.

In practice, the instrument is generally designed to carry two absorption cells. The transmittance of the unknown and blank are measured, or the transmittance of the blank is set at 100% and that of the unknown compared directly with the blank solution which should approach the composition of the unknown solution as closely as possible.

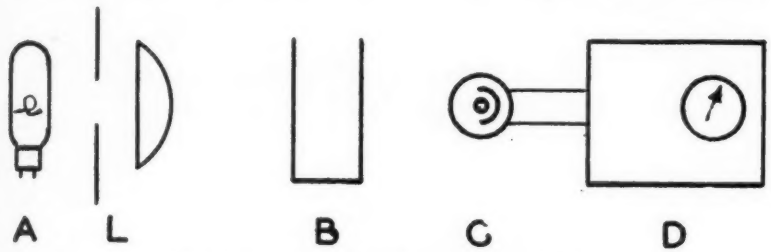


Fig. 2. Schematic arrangement of electrophotometer.

Actually a monochromatic source of light is not employed, and the primary difference between the electrophotometer and the spectrophotometer lies in the method employed to resolve the white light to a beam of narrow wave length. This is accomplished by glass filters in the former and by prisms or diffraction gratings in the more expensive spectrophotometers. Even the best spectrophotometers do not achieve monochromaticity but produce a beam of two to thirty-five millimicrons width. In the great majority of analyses, a spectrum width of thirty-five or even more millimicrons is satisfactory.

The reason for employing a beam of rather narrow wave length is that the variation is restricted to the spectral region of the material's greatest absorbancy. The correct wave length to be employed for each determination of impurities in nickel plating baths has been determined, and the report on THE DETERMINATION OF LEAD that is to follow the publication of this paper, will indicate clearly the method employed.

The actual mechanical manipulation of the electrophotometer used in the investigations carried out under the direction of this Committee, will be only briefly described under the experimental method for the determination of lead. An account of the use of one of the common electrophotometers was given in an earlier issue of THE MONTHLY REVIEW.[3]

It is the belief of the committee that the electrophotometer will become as familiar in plating laboratories as the analytical balance or the pH meter. However, it should be pointed out that in this work modifications of instrument measurements will be adapted to visual comparison for "in-the-shop" analysis wherever possible.

General Information

DESTRUCTION OF ORGANIC MATTER: A number of the methods will possibly work in the presence of organic addition agents while others are almost certain not to be applicable until the organic matter has been destroyed. To destroy the organic matter, add 5 ml of a solution containing equal volumes of concentrated nitric and sulfuric acids to the sample. Evaporate until crystals begin to form. Cool and add 10 ml of perchloric acid (70–72%), evaporate under the hood to copious white fumes, cool and add water to dissolve the salts which will separate out. If sufficient volume is used, silica may be fil-

tered off and weighed at this point. It should be explained here that perchloric acid is a dangerous reagent when handled carelessly, but is safe when reasonable precautions are taken. Solutions containing organic matter should be treated with nitric and sulfuric acids or nitric and hydrochloric acids *before* the introduction of perchloric acid, and the perchloric acid should *not* be introduced into a hot solution. During the period of "fuming down" with perchloric acid, no organic matter should be brought near the fumes and the solution, after fuming, should be cooled before the addition of water. This reagent when properly handled is a great time-saver and has been widely used without accident.

PURIFICATION OF REAGENTS: High purity reagents must be employed in colorimetric analyses; they must at least be free of the element being determined. A blank must be run on the reagents and should the reading be appreciable, the reagents must either be purified or new reagents procured. In this connection, it is well to remember that distilled water is a reagent and must be free from impurities.

TECHNIQUE: The determination of small amounts of impurities does not demand an analyst with special training. However, careful work is obviously necessary since the accidental introduction of a very small amount of the constituent being determined will nullify the results completely. Since the relative accuracy of most of the colorimetric methods are of the order of $\pm 5\%$, that is ± 2.5 mg/l when fifty parts per million of the constituent are present, it is recommended that a good 1 ml graduated pipette be used for sampling. Careful use of such a pipette should result in a relative accuracy better than 1% which is well within the accuracy of the methods. Where such a pipette is not available, recourse to dilution followed by removal of an aliquot may of course be made. It is good practice to bring the bath to room temperature before samping, as is generally done.

The Analysis of Nickel Plating Baths for Metallic Impurities

The bibliography[1] and review of past knowledge[2] pertaining to nickel baths included information and references which were essentially the starting point for this work. The experimental work has now progressed to the point where it is possible to report methods and their application to various types of baths. The methods for either separation or determination of copper, cadmium and zinc are new. In other cases, known methods have been adapted to plating baths. The committee again wishes to express its appreciation to the many persons who cooperated in this work.

The early experimental work was carried out at Princeton University by Dr. Frederick Duke under the direction of Dr. G. Frederick Smith of the University of Illinois. Methods for the determination of cadmium, chromium, copper, iron, lead, manganese, silica, and zinc were developed and each method was checked on the following baths:

a. All chloride bath[4]
   $NiCl_2.6H_2O$—3N
   H_3BO_3—0.5N

b. Fifty-fifty chloride-sulfate bath[4]
   $NiCl_2.6H_2O$—1.5N
   $NiSO_4.7H_2O$—1.5N
   H_3BO_3—0.5N

c. Watts bath[4]
   $NiSO_4.7H_2O$—2.35N
   $NiCl_2.6H_2O$—0.79N
   H_3BO_3—0.5N

d. High sulfate bath[5]
   $NiSO_4.7H_2O$—0.5N
   $Na_2SO_4.10H_2O$—1.0N
   NH_4Cl—0.28N
   H_3BO_3—0.25N

In addition, two industrial baths were analyzed. One which was relatively free of impurities was submitted by the International Nickel Company. The second was provided by the Standard Steel Spring Company as being ready for purification. After analysis, these commercial baths were included with the four baths prepared in

the laboratory and all were treated in the following manner. Each plating solution was divided into a sufficient number of portions. All the impurities except one were added to each portion in maximum amounts. Thus one portion contained all impurities except copper, another all except aluminum, etc. Then the missing impurity was added in nearly minimum amount[1], and the analysis run for that impurity.

Upon the transfer of Dr. Duke to Michigan State College, the program was transferred to Lehigh University where, under the direction of Dr. Serfass, Mr. Levine rechecked all the methods developed by Dr. Duke.

In order to preserve continuity throughout the series of papers to be released by the Committee, the data obtained at the latter university will be published under joint authorship of the four investigators. This became necessary partly as the result of using different instruments, the Cenco-Sheard spectrophotometer being employed at Princeton University and both the Klett-Summerson colorimeter and the Beckman spectrophotometer being used at Lehigh University. This further study also permits the incorporation of certain refinements which were developed on modification of the methods for use with the several instruments

Upon completion of the work at Lehigh, a sample of nickel bath was submitted to various laboratories together with specific directions for the determination of the impurity in question. The results obtained are incorporated in each report as verifying data for the method.

References

[1]Committee Report, MONTHLY REVIEW, American Electroplaters Soc., **32**, 367 (1945).

[2]Committee Report, Ibid, **32**, 805 (1945).

[3]Foulke, D. Gardner, Colorimetric Methods as Applied to the Analysis of Electroplating Baths, I. Lead, Ibid, **31**, 1103 (1944).

[4]Wesley, W. A. and Roehl, E. J., "Trans. Am. Electrochem. Soc.," **86**, 79 (1944).

[5]Thompson, M., Ibid, **47**, 163 (1925).

RESEARCH NEWS

NEW RESEARCH PROJECT

Research Committee Chairman E. T. Candee announces that a new Research Project No. 9 on "Physical Properties of Electrodeposited Metals" has been initiated at the National Bureau of Standards.

The Project Director is Dr. Abner Brenner and the Project Sub-Committee consists of Dr. William Blum, National Bureau of Standards, *Chairman*, and Messrs. L. G. Tubbs, Bureau of Aeronautics, Navy Department, and C. H. Sample, Rheem Research Products, Inc.

RESEARCH COMMITTEE APPOINTMENTS

Mr. E. T. Candee, the new Chairman of the Research Committee, has announced the following appointments for the ensuing year:

Chairman of the Research Directing Sub-Committee—Dr. R. M. Wick, Bethlehem Steel Corporation. Vice-Chairman of the Research Directing Sub-Committee—Dr. Louis Weisberg, Consultant, New York City.

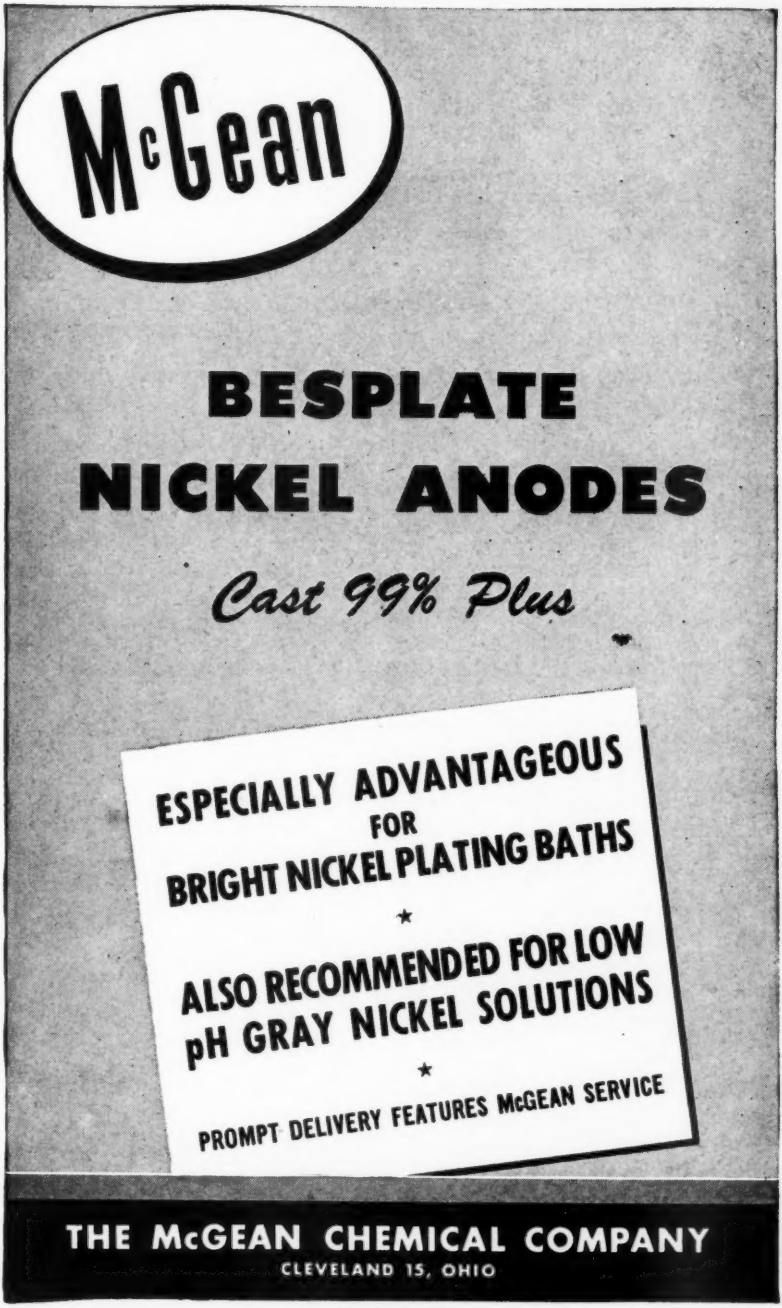
Chairman of the Finance Sub-Committee —Mr. C. E. Heussner, Chrysler Corporation. Vice-Chairmen of the Finance Sub-Committee—Dr. R. A. Schaefer, The Cleveland Graphite Bronze Company, and Dr. H. L. Kellner, The Lea Manufacturing Company.

Chairman of the Policy Committee—Mr. M. R. Caldwell, Doehler-Jarvis Corporation.

RESEARCH COMMITTEE TO MEET IN WATERBURY

The Research Committee will hold its next meeting in Waterbury, Connecticut, on Friday, September 13th at 10:30 A. M. The meeting place is the Waterbury Club on West Main Street.

Arrangements are being made to join the Waterbury Branch at its regular meeting the same evening.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By DR. HAROLD J. READ

Associate Professor of Metallurgy
The Pennsylvania State College

SYMPOSIUM ON STRESS CORROSION CRACKING OF METALS, VIII + 495 pages. Published jointly by American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., and Institute of Metals Division, American Institute of Mining and Metallurgical Engineers, 29 West 39th Street, New York 18, N. Y.

This volume contains the collected papers and the discussion thereof for a symposium held late in 1944. Thirteen papers relate to brass, seven to aluminum and magnesium, four to steel (three of which pertain to stainless steel) and four to miscellaneous metals. The only paper which concerns metallic coatings in a specific way is one of those on steel—a study of the effect of temperature and rapidly applied stress on the intergranular penetration of galvanized steel by zinc. In addition there is an introductory paper reviewing the general problem of stress corrosion cracking, and a final article which briefly summarizes all of the contributions of the various authors.

Although electrodeposited coatings are not dealt with specifically, any electroplater who is interested in the general aspects of corrosion will find a wealth of information in this significant and timely collection of papers. It is not possible in the brief space of this review to discuss individually each of the several papers, but an attempt will be made to indicate the general nature and trend of the subject matter.

The controversial subject of methods for stress corrosion testing comes in for a very considerable amount of attention. The reader will find extended discussions of the mechanical details of equipment, corrosion media and evaluation of results as well as opinions on the worth and validity of the results. Of particular interest are two papers which describe non-destructive tests for the detection of season cracking utilizing either the damping capacity or eddy current response of cartride brass. Thus it becomes possible in at least some cases to to carry out 100% inspection for season cracking.

The factors influencing stress cracking are discussed in several papers. One article approaches the problem from the viewpoint of the mechanical metallurgist, and the effects of different methods of working the metal are investigated. Another is concerned with the effects of alloy additions, while a third reports on the use of protective resin films as applied to the prevention of season cracking. Since the book is a war-time publication, it is not surprising to find that many of the papers deal almost exclusively with the manufacture of shell cases. Most of the results reported, however, are sufficiently fundamental in nature so that they may be applied to other products.

There are two rather long papers which deal with the theory and mechanism of stress corrosion. These are well-documented discussions which are significant additions to the literature on corrosion.

The several articles on stress corrosion of steel, nickel and nickel alloys, gold alloys, etc. emphasize the fact that this phenomenon is not limited to brass and the light metal alloys. Under certain conditions of environment and stress, cracking due to stress corrosion may occur in almost any metallic body.

The book is noteworthy for its excellent printing and the high quality of the many important half-tone reproductions. It is a volume which should be on the shelf of everyone interested in the subject of corrosion.

A. S. T. M. HOLDS ANNUAL MEETING

The intensive activity during the 1946 A.S.T.M. Annual Meeting held at the Statler Hotel, Buffalo, N. Y., throughout the week beginning June 24 indicated the intensive interest in the Society's rapidly expanding work on specifications and tests for materials and methods of evaluating assemblies of these materials in various forms. The total registration for the week was 1,825, second highest for this annual event, exceeded only by the 1944 Annual Meeting in New York where 2,100 members and committee members attended.

The meeting was outstanding in many respects, notably in the quality and character of the technical sessions. There were eight symposiums with technical papers ranging in number from four to fifteen covering a wide diversity of fields. Among the topics were Bearings, Fatigue, Spectroscopic Light Sources, Testing Parts and Assemblies, *p*H Measurements and Atmospheric Weathering of Corrosion Resistant Steels.

One of the meeting features was the Edgar Marburg Lecture by *Dr. J. J. Mattiello*, Technical Director, Hilo Varnish Corp., on the topic "Protective Organic Coatings as Engineering Materials." Dr. Mattiello's version of his complete lecture which was shortened for presentation was most interesting. When issued in printed form, the lecture will be of outstanding interest to all those who are concerned with this field. It should be available in the fall.

Probably the high point of the meeting was the Annual Meeting Dinner. President *J. R. Townsend* gave his Presidential Address on "The Challenge of National and International Affairs to the Engineer," and the guest speaker, *Dr. B. K. Sandwell*, Editor of Canada's famous publication *Saturday Night* spoke on "A Testing Time for Canada." Both speakers stressed problems in connection with our democratic way of life, Mr. Townsend emphasizing the importance of engineers and technically trained people being public affairs conscious. Dr. Sandwell, who covered problems of our democracies from the national standpoint, emphasized the significance of the United States as a leader in developing changes in our present system which will insure continuance of the political philosophies which governed his country, the United States, Great Britain, and others.

Arthur W. Carpenter, Manager of Testing Laboratories, The B. F. Goodrich Co., Akron, Ohio, was elected President for 1946–1947, succeeding *J. R. Townsend*, Materials Engineer, Bell Telephone Laboratories, Inc., New York, who continues on the Board of Directors as Past President for three years. *R. L. Templin*, Assistant Director of Research and Chief Engineer of Tests, Aluminum Company of America, New Kensington, Pa., is the new Vice-President to serve with the Senior Vice-President *T. A. Boyd*, Head, Fuel Department, Research Laboratories Division, General Motors Corp., Detroit, Mich. The new members of the Board of Directors are as follows: *A. G. Ashcroft*, Director of Research, Alexander Smith and Sons Carpet Co., Yonkers, N. Y.; *A. T. Chameroy*, Manager of Laboratory, Sears, Roebuck and Co., Chicago, Ill.; *J. H. Foote*, Supervising Engineer, Commonwealth & Southern Corp., Jackson, Mich.; *F. E. Richart*, Research Professor of Engineering Materials, University of Illinois, Urbana, Ill.; and *L. H. Winkler*, Metallurgical Engineer, Bethlehem Steel Co., Inc., Bethlehem, Pa.

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By KENNETH M. HUSTON

Chairman, Program and Educational Committee

Overvoltage of Hydrogen in Relation to the Composition of the Electrode Material

V. CROATTO and M. DA VIA. *U. Croatto. gazz. chem. ital.*, **73**, 117–143 (1943); *C. A.*, **38**, 3912 (1944).

The overvoltage of hydrogen in 6 N potassium hydroxide was studied with lead-tin and lead-cadmium alloy cathodes of varying composition. The current density required to attain a given overvoltage depends linearly on the alloy composition in the eutectic region, but not in the regions of solid solutions, owning to the different number of active centers on the surface. In 15 N sulfuric acid at 120° C, lead containing small amounts of silver, nickel or copper corrodes electrochemically because of the occurrence of two separate phases; with small amounts of zinc, tin, antimony, cadmium or bismuth, corrosion is "purely chemical" (displacement of hydrogen).

ERNEST H. LYONS, JR.

●

Methods for Measuring the Thickness of Corrosion-Protective Coatings

D. SCHENK. *Korrosion u. Metallschutz*, **19**, 1–5 (1943); *C. A.*, **38**, 3238 (1944).

The thickness of zinc and aluminum coatings on steel was determined by measuring the energy loss of X-rays in passing through the coating and was found correct within 0.000008-0.00004.

ERNEST H. LYONS, JR.

●

Electrode Polarization in the Simultaneous Deposition of Two Metals from Solutions of Their Complex Salts

A. LEVIN and V. SOTNIKOVA, *J. Gen. Chem.* (U. S. S. R.), **13**, 667–673 (1943) (*English Summary*); *C. A.*, **39**, 462 (1945).

Polarization and deposition were studied in a brass plating bath composed of copper and zinc acetates, ammonium thiocyanate, sodium hydroxide and sodium bisulfite.

ERNEST H. LYONS, JR.

●

The Chemistry and Structure of Anodically Produced Deposits and Surface Films

KURT HUBER. *Helv. Chem. Acta*, **26**, 1037–1054, 1253–1281 (1943); *C. A.*, **38**, 2273.

I. THE ANODIC BEHAVIOR OF ZINC IN NaOH SOLUTIONS. Zinc was made anodic in NaOH solutions of concentrations from 0.02 to 4 N. The voltage gradually increased from 0.8 volt, and the corresponding current density was observed. The anode dissolved at constant potential for a time; when it suddenly became passive, its potential became more noble by more than 3 volts. The active anode became coated with white

material, first along the grain boundaries, later over the whole surface. X-ray analysis showed that this deposit was mainly gamma $Zn(OH)_2$ with traces of white ZnO. During the passive state, a dense, dark surface film of ZnO formed in 1 N NaOH. It contained traces of amorphous $Zn(OH)_2$ in the more dilute solutions. Between the active and passive state is a region where a definite cd is maintained, almost regardless of the applied voltage; in this region of electropolishing, there is competition between formation of a thin surface film and its dissolution by the electrolyte.

II. The Anodic Behavior of Zinc in Mixed Solutions of NaOH and Other Na Salts. When part of the NaOH was replaced by Na_2SO_4, keeping the total Na ion concentration at 1 N, similar results were obtained; but at low NaOH concentration, active patches remained as funnels or tubes through which gas was evolved between passive, oxide-filmed areas on which a white basic $ZnSO_4$ with $Zn(OH)_2$ formed. With Na_2CO_3 instead of Na_2SO_4, very little hydroxide formed in the active state and dark ZnO in the passive state. When the electrolyte contains Na_2CO_3 and $NaHCO_3$, the active patches are coated with half-basic zinc carbonate or, in the less alkaline solutions, crystalline sodium zinc carbonate. The basic and salt-like products were precipitated from the supersaturated solution around the anode, on which the oxide film is formed by direct interaction between the metal and OH ions.

Ernest H. Lyons, Jr.

●

Determination of the Total Cyanide in Alkali Cyanide Baths

A. WOGRINZ. *Monatsh.*, **74**, 233–240 (1943); *C. A.*, **38**, 3552 (1944).

To determine the total cyanide instead of the free cyanide, all of the cyanide is precipitated as $Hg(CN)_2$, from any cyanide electroplating bath. To a suitable sample, add a mixture of $HgCl_2$(5 g in 40 ml hot water) and 10 ml of 10% NaOH and heat. Filter off the precipitate and treat it with NaOH and powdered Zn to dissolve the cyanide as NaCN which is then titrated with $AgNO_3$. The accurary is satisfactory.

Ernest H. Lyons, Jr.

●

Metal Electrodes in Saturated Solutions

V. CUPR. *Korrosion u. Metallschutz*, **18**, 259–271 (1942); *C. A.*, **38**, 4198 (1944).

Theoretical discussion and equations are given for diffusion layers at electrode surfaces in simple electrolytes.

Ernest H. Lyons, Jr.

●

Recent Investigations on Electrolytic Polishing of Metals

ROBERTO PIONELLI, DANIEL PORTA and LUCIANO ARDUINI. *Ricerca sci.*, **14**, 156–160 (1944); *C. A.*, **38**, 5732 (1944).

The optimum conditions for electrolytic polishing were studied with an oscillograph; they do not coincide with a stable passive state. As reaction products accumulate in the anode layer, a film of almost insoluble substance is finally shed.

Ernest H. Lyons, Jr.

●

Electrodeposition with Alternating Current Superimposed on Direct Current

GERHARD HEINRICH and ALFONS KLEMENC. *Z. Elektrochem.*, **49**, 471–474 (1943); *C. A.*, **38**, 5733 (1944).

Studies of electrolysis with superimposed ac indicate that the electrodes will not change polarity unless the ac is greater than 3/2 of the dc.

Ernest H. Lyons, Jr.

●

The Role of Addition Agents in the Electrodeposition of Metals. II.

HELLMUT FISCHER. *Kolloid-z.*, **106**, 50–62 (1944); *C. A.*, **38**, 4869 (1944).

In low concentrations (0.1–0.5 g/l), colloids act chiefly to block off the active spots on the cathode so as to smooth the deposit. Organic compounds such as gelatin first

show signs of concentration polarization and high resistance of the cathode at concentrations of 100 g/l or higher because the very heavy absorbed film hinders diffusion to the cathode and increases the electrical resistance. In neutral solutions, a secondary film of metal hydroxide often forms in the cathode film. A layer of hydrogen bubbles of colloidal dimensions observed on the colloid film at the cathode, tends to produce a high cathode potential and concentration polarzation.

ERNEST H. LYONS, JR.

●

Phosphatizing and Its Scientific Foundations

W. MACHU. *Metallwirtschaft*, **22**, 481–487 (1943); *C. A.* **38**, 4897 (1944).

A general discussion of phosphatizing. Solutions containing phosphoric acid and zinc or managanese phosphates are most successful; alkali, alkaline earth, volatile or molten phosphates are unsatisfactory. The coating should be about 96% tertiary and 4% secondary zinc phosphate, bath temperature 200-210° F. Modern cold processes are effective in a few minutes at 70–75° F. Pores amount to less than 0.5–0.8% of the surface. Many details are discussed.

ERNEST H. LYONS, JR.

●

A New Bright Silver Plating Bath for Rapid Production

R. WEINER. *Metallwirtschaft*, **22**, 472–474 (1943); *C. A.*, **38**, 4868 (1944).

Bright silver deposits needing no polishing are obtained by adding selenium (as a selenite) to the usual cyanide bath. The current density is 20–30 amp/sq. ft. and the current efficiency 100%. Rapid agitation of the cathode or the electrolyte is necessary. To avoid pasivity, the anode should have a larger area than the cathode. Anode slime should be removed by settling or filtration. The silver deposit is much harder than that of ordinary silver plate, but becomes soft when heated; the hardness is due to the structure of the deposit and not to its selenium content. The baths have been used for a long time and are covered by German patents to Weiner.

ERNEST H. LYONS, JR.

●

The Effects of Added Materials on Pickling Acid

K. WICKERT. *Metallwirtschaft*, **22**, 475–480 (1943).

Addition of NaCl to HCl speeds up the pickling of iron, while Na_2SO_4 slows it down. Other inhibitors and accelerators are also discussed.

ERNEST H. LYONS, JR.

●

Phosphate Coatings on Steel: A Symposium

Korrosion u. Metallschutz, **19** (1943); C. A., **38**, 4237–4238 (1944).

W. MACHU (269–74): Alloying constituents of the steel have little effect on the porosity of phosphate coatings; surface condition is more important. Pickling increases the porosity of the coating from 5–8 times on almost all steels, because coarser crystals of tertiary and secondary zinc phosphate formed after pickling have poor covering power. The pretreatment of the surface controls the corrosion resistance of the phosphatized surface. A. FOLDES (281): Cold (77° F) baths of zinc phosphate with NaF as a buffer have a constant pH (2.6–2.8) and give uniform results. O. MACCHIA AND M. BORLA (284–5): Phosphate coatings are not good electrical insulators for cores of electrical apparatus; sand-blasting gives improved results. L. SCHUSTER (265–9): Satisfactory coalescence of the phosphate layer depends on good mixed phosphate formation. The composition, surface condition and pretreatment of the steel influence this; annealing has considerable influence. The use of oxidizing agents as accelerators in the phosphate bath minimizes the effect of these factors. The goal of pretreatment is to secure optimum coating formation. L. SCHUSTER AND A. SCHALL (279–80): Without accelerators, three times as much hydrogen is evolved from manganese phos-

phate baths as from zinc phosphate baths. If nitrate is present, it is reduced to nitrogen; this oxidation of hydrogen is the cause of the more rapid coating formation and has led to the rapid adoption of the zinc phosphate process. W. MACHU (274–9): Zinc or manganese phosphate coatings from bonderizing or parkerizing baths rapidly fail in the dipping test with 3% NaCl. An after-treatment with sodium chromate solution prolongs the life of the coatings by decreasing porosity as well as by anodic passivation, preventing local cell formation.

ERNEST H. LYONS, JR.

●

Enameling Aluminum Alloy

ALDEN J. DEYRUP and CAMPBELL ROBERTSON. *Canadian Patent* 430,254 (Sept. 25, 1945); *C. A.*, **40**, p. 1298 (March 10, 1946).

A vitreous enamel is applied to an aluminum alloy, and the metal is heated to melt the enamel, and then quenched by water or air blast to mature the protective coating.

●

Mechanism of Natural Oxidation of Aluminum, Iron and Copper

S. ANDERSON. *Phys. Rev.*, **69**, 52 (Jan. 1 and 15, 1946); *Light Metals Bull.*, **10**, 160 (March 8, 1946).

The author's theory of electrolytic oxidation of aluminum has been extended to include the natural oxidation of aluminum, iron and copper. When so applied, it appears that space charges control the rate of growth in the early stages. Equations are devised for the three stages of growth: (1) when the mean free path of the moving particles is large in comparison to the oxide thickness, (2) when the mean free path of the moving particles is small in comparison to the oxide thickness, and (3) when the oxide is so thick that space charges are no longer the controlling factor. These questions predict a third power law of rate of growth for stage 1, a fourth power rate for stage 2, and a quadratic law of growth for stage 3. The equations are compared with data of numerous experimenters and agree quite well with the observed rates.

●

The Effect of Sulfate in the Bengough-Stuart Anodizing Solution

DAVID JACKSON. *J. Electrodepositors' Tech. Soc.*, **20**, 177–184 (1945); *J. Inst. Metals*, **13**, 86 (March 1946).

A 3 per cent chromic acid solution with below 0.1 gram per liter sulfuric acid produces semiopaque anodic films on aluminum; between 0.1 and 0.3 gram per liter, opaque films are obtained, and above 0.3 gram per liter, transparent ones. The presence of sulfate causes rapid reduction of chromic acid and consequent short life of the bath, which, however, may be compensated for by use of a higher cathodic current density. The concentration of sulfuric acid in an anodizing solution may be reduced by treatment with barium hydroxide solution, and it is unnecessary to filter as the presence of suspended particles does not appear to impair the anodizing process.

●

Permeation and Sorption of Water Vapor In Varnish Films

A. M. THOMAS and W. L. GENT. *Proc. Phys. Soc.*, Lond., **57**, 324–349 (July 1945; *Physics Abstracts*, **49**, 17 (Jan. 1946).

An experimental investigation on the moisture permeability and sorption of detached varnish and polystyrene films is described. Details for preparation of samples and methods of test under various conditions of vapor pressure and temperature are given. Both the permeability and sorption of the films were determined at constant moisture concentrations by using streams of moist air, the amounts permeating and the amounts sorbed being directly weighed. In addition to moisture permeability, some measurements of that of hydrogen gas and carbon dioxide are reported. Consideration of the experimental results shows that they can be interpreted by assuming that the diffusion process is analogous to that of substances in solution. There is insufficient evidence to

show the effect of vapor pressure and temperature on the moisture permeability, but the results for carbon dioxide and hydrogen gas indicate that the diffusion process is dependent on the microphysical properties of the film. The effect of structure on diffusion is discussed, and the relations of the results to the problems of electrical insulation are considered.

●

Plating Aluminum-Copper-Magnesium Alloys

H. KOSTRON. *Korrosion u. Metallschutz*, **18**, 343–346 (1942); *C. A.*, **40**, 305 (Jan. 20, 1946).

Pure aluminum coatings on aluminum alloys have the advantage of greater resistance to atmospheric corrosion, but alloying elements, such as copper, in the protected metal readily diffuse through the coating during heat-treatment and lessen corrosion resistance. Optimum results are secured by a triple coating: first a thin coat of pure aluminum on the alloy base, then a layer of aluminum-manganese alloy to limit diffusion, and finally an external coating of pure aluminum.

●

Corrosion in Crevices

E. H. WYCHE, LORRAINE R. VOIGT and F. L. LAQUE *Trans. Electrochem. Soc.*—Preprint **89**–23. 14 pp.

The nature of corrosion in crevices and its occurrence are described. Sea water tests on various crevice sealing compounds are reviewed, petrolatum being found most effective. Practical suggestions for avoiding crevice corrosion are listed.

LEONARD E. WEEG.

●

Passivation of Stainless Steel

E. M. MAHLA and N. A. NIELSEN. *Trans. Electrochem. Soc.*—Preprint **89**–27. 23 pp.

The strength and stability of passive films produced on stainless steel by various passivating treatments have been evaluated. In addition, electron diffraction has been applied to the study of passivated stainless steel surfaces and of bulk oxide films. Breakthrough potential data and confirmatory immersion corrosion data showed that no passivation treatment confers lasting protection to stainless steel immersed in media which corrode the unpassivated metal. Equally effective results were obtained with stainless steel which was cleanly pickled, thoroughly rinsed, and air dried. Although no definite evidence of the existence of passive films was found by reflection electron diffraction studies, bulk oxides produced by chemical or air oxidation on 18–8–S stainless steel were found to consist chiefly of Cr_2O_3 with no nickel oxide and little iron oxide present. The bulk oxides formed by air oxidation on straight chromium-iron alloys consisted of FeO, Fe_3O_4, Fe_2O_3, and mixtures of these oxides.

LEONARD E. WEEG.

●

Acidic Atmosphere Evaluation of Cleaning on the Corrosion of Steel

CHESTER W. SMITH. *Trans. Electrochem. Soc.*—Preprint **89**–25. 18 pp.

Cleaning methods used on steel produce differences in the corrodibility of the surface with exposure to the normal elements present indoors in industrial atmospheres. The "acidic atmosphere cell" which was devised, produced a type of corrosion similar to that encountered in actual exposure. This simple accelerated corrosion test incorporated many of the significant factors present in regularly encountered shop atmospheres, *e. g.*, moisture, acidic gases, oxygen, temperature variations. The cell was used as a mean of evaluating different cleaning materials and methods in regard to their effect upon the corrodibility of bright steel. The effect of cleaning upon the subsequent corrodibility of the steel was the primary consideration. Cleaning methods using abrasives, alkaline compounds, volatile or partially volatile solvents, or emulsified solvents were compared as to effects on bright steel and when exposed in the "acidic

atmosphere cell." Emulsified solvent cleaning materials which leave a film of nonvolatile emulsifier render steel surfaces the least corrodible.

LEONARD E. WEEG.

●

The Electrowinning of Chromium from Trivalent Salt Solutions

R. R. LLOYD, W. T. RAWLES and R. G. FEENEY. *Trans. Electrochem. Soc.*—Preprint **89**–20. 12 pp.

A process for electrowinning chromium from trivalent salt solutions has been developed by the U. S. Bureau of Mines, and two methods for producing chromic sulfate electrolyte from domestic chromites have also been developed; flow sheets for each process are included. Effects of the most important variables on the electrodeposition of chromium are discussed and optimum values are given. The variables discussed are: divalent chromium concentration, sulfite addition, purity of electrolyte, temperature, pH, current density, and concentration of sodium, ammonium and total chromium in the electrolyte. Typical operating data, obtained in a 50 lb/day (22.7 kg/day) pilot cell, are tabulated.

LEONARD E. WEEG.

●

Electricity for the Plater VIII

D. A. COTTON. *Products Finishing*, **10**, 40–48 (March 1946).

This article is devoted to the application of Faraday's laws in the electroplating industry. Two expressions of these principles are:

1. The weight of metal deposited is directly proportional to the product of the current and the time.

2. The weight of metal or element deposited by any given quantity of electricity is directly proportional to the atomic weight of the element and inversely proportional to its valence.

The columns in the tables of electrochemical equivalent, such as atomic weight, valence, equivalent weight, specific gravity, etc., are explained in relation to the formulas listed, for determining—

(a) Plating time in a known electrolyte to produce a pre-determined thickness or weight of deposit when the current density and the cathode efficiency are known.
(b) Thickness or weight of deposit when the plating time, current density and cathode efficiency are known.
(c) Current density used when the thickness or weight of deposit, cathode efficiency and plating time are known.
(d) Cathode efficiency.

The formulas are valuable and useful to all interested in electroplating.

RAYMOND F. LEDFORD.

●

Hard Surfacing Light Metals

W. C. REID. *Modern Metals*, **2**, 6–7 (April 1946).

A brief note discussing metallizing both in protecting and applying aluminum and magnesium alloys.

●

Electricity for the Plater X

D. A. COTTON. *Products Finishing*, **10**, 76–82 (May 1946).

This part deals with alternating and direct current as applied to motor windings and generator. It is pointed out that if a current is made to flow through a coil of wire placed in the magnetic field, the coil, if free to move, will rotate about an axis parallel to the face of the magnetic pole. In electric motors if, instead of forcing current through the coil and thus causing it to rotate, it is made to rotate by mechanical means such as a belt and pulley, a voltage will be induced in the coil. The distinction between motor and generator principles is summarized simply as follows:

Magnetic field plus current carrying coils equals mechanical rotation (motor).

Magnetic field plus mechanical rotation equals current generation (generator).

The author describes the reason why alternating current cannot be used for electroplating and outlines in detail several

formulas for determining current flow through rotating motor armatures having a predetermined resistance, as well as the role of voltage, phase and cycle in the particular application of these equations.

RAYMOND F. LEDFORD.

●

The Electrodeposition of Speculum

R. M. ANGLES, F. V. JONES, J. W. PRICE and J. W. CUTHBERTSON. *J. Electrodepositors' Tec. Soc.*, **21**, 19–44 (1946).

A rather complete investigation has been made on the electrodeposition of speculum (tin-rich white bronze) from solutions containing sodium cyanide, copper cyanide, caustic soda, sodium stannate and, in some cases, soda ash and Rochelle salt. Tin and copper anodes are controlled in separate circuits to maintain the optimum copper-tin ratio in the solution. The composition of the deposit is maintained within 2%, largely by control of the free cyanide and free caustic concentrations in the solution. Recommended deposit composition for plating is 45% tin—55% copper, recommended operating temperature 149° F.

A study has been made of the effect of variations in different plating conditions. Aging of the solution is explained. A preliminary survey has been made of the use of potassium in place of sodium salts. Analytical methods are given. Graphs, tables, and illustrations are presented.

LYMAN B. SPERRY.

●

New Process for Electroplating Aluminum

Chemical Age, **53**, 516 (1945); *Light Metals Bull.*, **9**, 568 (1945).

It is reported that the firm A. E. R. (1938) Ltd. of London has developed a successful process for the electroplating of metals upon aluminum. Among the platings that can now be supplied are lead, iron, copper, tin, silver (matt or polished), cadmium, zinc, gold, brass and nickel (dull or polished).

Combination of Acids Employed in Pickling Processes

E. W. MULCAHY. *Steel*, **118**, 122–124(April 15, 1946).

Two normal methods of pickling steel include use of hydrochloric acid at normal temperatures and sulphuric acid at from 158 to 194° F. Hydrochloric acid provides a brighter and cleaner finish while sulphuric acid, although requiring steam heating, is a quicker and cheaper means, mainly because of the difference in the cost of the acids at commercial strength.

Dr. de Lattre of Belgium has evolved a pickling process which retains the technical advantages of hydrochloric acid solutions, yet gives the ease of recovery of spent sulphuric acid pickling baths. The process described is based upon the reaction: $FeCl_2 + H_2SO_4 = FeSO_4 + 2HCl$. Advantages are cited.

●

Sodium Hydride Descaling

W. B. BILLINGSLEY. *Can. Metals Met. Inds.*, **9**, 19–24 (1946); *C. A.*, **40**, 1763 (April 10, 1946).

Alkaline pickling processes have many advantages which are listed. The laboratory development of the process, large-scale installations, and the operating procedure are noted. The action is based on the use of a powerful reducing agent. Sodium hydride is formed in the fused caustic soda bath by combining sodium metal with hydrogen generators, generally in the alkali tank.

●

The Importance of Surface Cleaning For Metal Finishing

G. W. SEAGREN. *Corrosion and Material Protection*, **3**, 6–7, 21–23 (January 1946).

Most important single factor determining life of a protective coating is surface preparation of metal, as was proved by bitter experience during the War with material shipped to the Pacific and arriving with only

10% of its original paint adhering to goods, in one case. Removal of mill scale and rust, use of inhibitors in final rinse water to prevent corrosion while drying, and hydrogen absorption during pickling and acid electroplating are discussed.

●

Checking Surface Finish

ANON. Steel, **118**, 115, 158 (January 28, 1946).

A new instrument for checking and controlling surface finish is the Comparoscope, which measures by a simple optical method surface wear as proportional to percentage of interrupted area in the same plane (instead of only the number of interruptions per unit area or depth of interruptions). Basic principle is based on fact that a light beam thrown at a given angle upon a perfect surface will be reflected at the same angle, while surface interruptions form minute prismatic surfaces throwing light back in the observer's eye. Instrument is a dual microscope. Its use is versatile. In grinding work, it reveals action of wheels on metals being ground. Voids between individual particles filled with bonding material, causing the wheels to load and give inferior performance, are revealed. Manufactured by Compar Instrument Co., Detroit.

●

Regenerative Plating and Other Applications of Porous Diaphragms and Cells

M. B. DIGGIN. Metal Finishing **44**, 8–12, (January 1946).

Regenerative plating is described and its uses and advantages discussed. Typical regenerative plating installation, converted roll plating tanks, effect of material in anode bags (treated and untreated) on nickel deposits, and other pictures are shown. Insoluble anodes are used which makes for improved quality of deposit. A fixed anode-cathode distance and a fixed ratio are maintained, saving disassembling work. Diaphragms can be used for overcoming excessive anode polarization. A method for investigating the effects of an anode material of uncertain history on deposit characteristics is described. Materials for anode bags are mentioned.

●

The Tinning of Cast Iron

R. A. CRESSWELL. *J. Iron & Steel Inst.*, Advance Copy, 1–13 (February 1946).

The quality of hot-dipped tin coatings on cast iron after different pre-treatments is investigated, using the criteria of continuity of coating, rust resistance and adhesion. Nature of the bond between tin and cast iron is also studied microscopically. Poor tinning quality of cast iron is shown to be caused mainly by the presence of graphite flakes and to be intensified by contamination of the iron surface by graphitic sludge after pickling in acids. Improved tin coatings can be obtained by reducing the duration of pickling in acids to a minimum which is facilitated by good mechanical cleaning. Two new methods of preparing cast iron for tinning are described: (1)immersion in a fused zinc chloride-sodium chloride eutectic mixture at 300–350° C. followed by dipping in tin covered with a layer of the same fused salt mixture at 300° C; (2) light pickling in acid to "open up" graphite flakes, immersion for 15 minutes at 300–350° C in fused sodium nitrate-potassium nitrate eutectic mixture in order to oxidize surface graphite, pickling in dilute hydrofluoric acid to remove the scale formed in the nitrate bath, fluxing and tinning. Adhesion values by both are given.

●

The Degassing of Chromium Deposits by the Intermittant Process

K. SACHTLEBEN. *Korrosion & Metallschutz*, **19**, 104–5 (1943).

A description of an intermittent electrolytic treatment of chromium plates with reverse current for removal of hydrogen adsorbed in plating is given with advantages of this degassing treatment over heat treating. Experimental proof of effectiveness and explanation of mechanism of the new process are presented.

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By GEORGE B. HOGABOOM

Consultant, New Britain, Conn.

No. 2,401,331—Acid Rhodium Plating—Abner Brenner, assigned to U. S. Government.

4. The method of treating a rhodium plating solution to maintain high reflectivity of rhodium coatings electrodeposited therefrom, which consists in removing from the plating solution, when the reflectivity of such coatings tends to diminish, zinc and like base metals the presence of which is deleterious to such reflectivity, such removal being effected by adding to the plating solution a solution of potassium ferrocyanide in slight excess of the amount necessary to precipitate such metals as ferrocyanides, removing the excess ferrocyanide by addition of ferric sulfate, separating the solution from the resulting precipitates, and then returning the separated solution for further electrodeposition of rhodium coatings therefrom.

No. 2,401,428—Electrodeposition of Nickel—Milton Kosmin, assigned to Monsanto Chemical Company.

Biphenyl high-boiler, 40% hydrogenated, is converted into polysulfonic acids and thence into the nickel polysulfonates by the following procedure:

Approximately 75 grams of the 40% hydrogenated biphenyl high-boiler and 150 grams of carbon tetrachloride are placed in a sulfonation flask cooled by an ice bath, and sulfur trioxide (prepared by heating 65% oleum in a sulfur trioxide generator) is passed in until the weight gain is about 77 grams and loss in weight of the oleum flask is 100.5 grams. The sulfur trioxide generator is then uncoupled and dry air is blown through the sulfonator charge until all absorbed sulfur trioxide is removed. Throughout the sulfonation and blowing operations a temperature of approximately 70° C. to 80° C. is maintained. The solvent is then removed, and the product is converted to the nickel salt as by neutralization with nickel carbonate. The product is thereafter drum-dried.

The sulfonates produced by the above process are believed to be polysulfonates, that is di-, tri-, and tetrasulfonates are present in the product. When polysulfonating a hydrocarbon mixture such as that herein treated, it is preferred to carry the sulfonation to the point where the mixture contains, on the average, sulfonation products equivalent to the trisulfonate. Where sulfonation is conducted as described, the product, while containing largely trisulfonated hydrocarbons, will also contain some proportion of the di- and the tetrasulfonated products.

The nickel polysulfonate thus obtained, largely trisulfonate of 40% hydrogenated biphenyl high-boiler, was evaluated as an adjuvant in the electrodeposition of nickel. For this purpose there was used a representa-

tive nickel bath, known as Watt's solution, and comprising the following constituents:

Nickel sulfate	24.0%
Nickel chloride	7.5%
Boric acid	3.75%
Water	64.75%

To two liters of the above solution there was added 70 grams (3.5% by weight based upon volume of Watt's solution) of the nickel polysulfonate.

Current density—20–30 amp/sq. ft.
Temp. of bath—160° F.–175° F.
Plating time—30 minutes
Anodes—Nickel, bagged in desized cotton

No. 2,402, 185—Tin Electrodepositing Composition and Process—E. W. Schweikher, assigned to E. I. du Pont.

EXAMPLE I

A tin electrodepositing bath made up as follows:

Stannous chloride	75	g/l
Sodium fluoride	37.5	g/l
Sodium bifluoride ($NaHF_2$)	37.5	g/l
Sodium chloride	22.5	g/l
Hydrochloric acid (20° Bé.)	12.5	cc/l
"Carbowax" 1500	0.1	g/l
"Schaeffer's" salt	1.0	g/l
Potassium ferricyanide	0.25	g/l
Sodium thiocyanate	0.25	g/l

pH 2.5.

The "Carbowax" 1500 is a polyethylene oxide of molecular weight about 1500.

The above bath containing a thiocyanate and a ferricyanide according to the present invention was much more stable and formed far less sludge than a bath otherwise similar but omitting the thiocyanate and ferricyanide. Similar results were obtained using ferrocyanide.

EXAMPLE II

A stannous electrodepositing bath of the present invention was prepared with the following:

Stannous sulfate	68	g/l
Sodium fluoride	26	g/l
Sodium bifluoride	41	g/l
Sodium sulfate	75	g/l
Beta-naphthol ethylene oxide	0.1	g/l
Potassium ferrocyanide	1.0	g/l
Sodium thiocyanate	0.25	g/l

pH 2.0.

EXAMPLE III

A dry prepared composition formulated according to the present invention was made up as follows:

Stannous chloride	66	%
Sodium fluoride	33	%
Potassium ferricyanide	0.5	%
Sodium thiocyanate	0.5	%

The above composition can be employed simply by dissolving in the required amount of water to give a bath like that of Example I and by adjusting the acidity to about pH 2.5 with a suitable acid such as hydrochloric.

No. 2,402,801—Electrodeposition of Nickel—Henry Brown—assigned to The Udylite Corporation.

On the addition of 1 gram per liter or less of thallium sulfate and 1.5 grams per liter of o-benzoyl sulfimide and 1 gram per liter of p-toluene sulfonamide to an acid nickel bath such as those listed in Table II, a brilliant, ductile plate is obtained over the entire plate except the lowest current density areas (e. g. 3 amp/sq. ft. or less) which are white rather than brilliant. If the pH is too high, this white area extends to the higher current density areas. The thallium now acts very much like zinc and cadmium in the nickel bath (and not like copper). Too high concentration of thallium, like that of zinc and cadmium, causes the plate to be exceedingly brilliant but too hard and brittle and also makes the recesses dark; however, at optimum concentrations, the plate is both ductile and bright with a very good rate of brightening. A plate of .0005"—.001" of such nickel will have a brilliant luster even when plated over steel finished with a final 180 grease emery. The best pH values are from 2.5 to 4.5 at a temperature of about 50°C., with the widest bright plating range at the lower pH values. The presence of ammonium salts are not desirable, especially in warm baths, as they decrease the ductility of the plate. In cold baths, a greater concentration of ammonium salts can be tolerated and less thallium must be used. Sodium, and especially magnesium salts, are not nearly as critical but in general, it is preferred not to have much of such salts present.

TABLE II

$NiSO_4 \cdot 7H_2O$ g/l	$NiCl_2 \cdot 6H_2O$ g/l	H_3BO_3 g/l	Temp. °C.	pH
250–300	35–45	35–40	40–60	2.5–4.5
——	200–350	35–40	40–60	2.5–4.5
200–250	75–100	35–40	40–60	2.5–4.5

No. 2,402,834—Manufacture of Ductile Stainless Clad Rolled Strip—John S. Nachtman.

4. The method of making ductile stainless and stainless clad rolled steel strips, which consists in electroplating upon a low carbon rolled steel strip base layers of chromium, iron and nickel, said metals being in the required proportions to give the desired stainless steel analysis in the finished product, and then subjecting the plated base stock to at least two heat treating and one intermediate cold rolling operations to completely diffuse the plated metals with each other and at least partially diffuse the plated metals with the base stock, and performing the heat treating operations at temperatures within the range of 1100° F. to 2500° F.

ELECTRODEPOSITORS' TECHNICAL SOCIETY

The Annual Election held at the Spring Meeting on May 27th resulted in the election of the following Council, which will be in office for the 22nd Session, 1946–47 (commencing in September next).

President—Dr. S. WERNICK.

Immediate Past President—DR. J. R. I. HEPBURN

Vice-Presidents—DR. H. J. T. ELLINGHAM, DR. G. E. GARDAM, and F. L. JAMES.

Honorary Treasurer—F. L. JAMES

Deputy Honorary Secretary—S. W. BAIER

Ordinary Members of Council (Elected by Postal Ballot)—DR. J. E. GARSIDE, R. A. F. HAMMOND, H. SILMAN, A. SMART, and A. W. WALLBANK.

Faraday Society Representative—DR. A. HICKLING.

Ex-Officio Members—N. A. TOPE (Chairman, Midlands Centre), R. C. DAVIES (Hon. Secretary, Midlands Centre), and E. A. OLLARD (Hon. Secretary, Standards Committee).

The names of many of these men are known to our readers for their important contributions to electroplating. The new president, Dr. Wernick, visited U. S. shortly before the war and made many friends here.

The address of the Society is Northampton Polytechnic Institute, St. John Street, Clerkenwell, London E. C. I., England.

DR. J. G. THOMPSON APPOINTED CHIEF OF METALLURGY DIVISION

Dr. John G. Thompson has been appointed Chief of the Metallurgy Division at the National Bureau of Standards, succeeding J. Rawdon, who retired this spring. Dr. Thompson has been Chief of the Bureau's Chemical Metallurgy Section since 1930 and Assistant Chief of the division which he now heads since 1942.

He organized and directed the investigations at the Bureau on the metallurgy of uranium, from the beginning of the project through all its changes in direction. Among other war-time activities with which he was connected was a study of aluminum and beryllium for use in airplane engines. He has also been actively identified with studies of "pure iron," special refractories for high-temperature metallurgical work, and effects of gases in metals. In 1938 Dr. Thompson and his colleagues succeeded in producing very pure iron, 99.99 + %, the highest purity ever attained.

William F. Roeser, Chief of the Mechanical Metallurgy Section, has been designated assistant chief of the division. In cooperation with the Office of the Surgeon General, U. S. Army, Mr. Roeser has been identified with experimental work and development of specifications for prosthetic devices, including artificial limbs and materials for internal fixation of bones. He also made tests and studies of solders and soldered joints, which assumed importance because of war-time shortage of tin.

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PHILADELPHIA BRANCH

Retiring President Zurbach opened the May meeting with two officers absent. Del Robson then installed the newly elected officers.

Five applications were approved and referred to the Board of Managers. There was one transfer to the new South-Eastern Branch.

The Detroit Amendment to the By-Laws in reference to the secretary's duties, was left to the delegates.

President Henry Orlik made the following appointments:

Second Vice-President Heiman to head the Membership Committee; Albert Hirsch, Chairman of the Branch Research Committee; William Marcovitch, Editor of the Quaker City Reminder; and Nat Verrelle, Chairman of the Entertainment Committee.

Librarian Hirsch then introduced the speaker of the evening, Mr. Delmar Robson whose subject was "The Ampere-Hour Meter." By co-ordinating analyses with the ampere-hours passed, one can lengthen the time between analyses.

PAUL MENTZER, SR., *Secretary.*

●

CLEVELAND BRANCH

There were 25 members present at the regular monthly meeting on Friday, June 7, in the Cleveland Hotel.

Two new members were elected unanimously. An Auditing Committee was appointed, consisting of George Svenson and Russ Lyons, to audit the books for the past year. A motion was made and passed to have refreshments served at the end of the meeting.

President Steve Miller made a very nice speech, offering his thanks and discharging his various committees. In the absence of our very good friend William Scott, Russ Lyons then proceeded with the installation of the new Officers, charging them with their duties and receiving their pledge of cooperation. He then had the members rise and obtained their promise to back up the new officers.

In the absence of Dr. Schaefer, First Vice-President Harvey Heil took over the meeting.

Two applications were read and approved.

How to vote the Amendments to the By-Laws at the Pittsburgh Convention was left to the discretion of the Delegates. The Delegates were to get together to decide which of the various phases of the Convention each would cover.

Mr. Esner kindly offered to manage the picnic and will select his own committee. Tom Gill then asked everyone's help in continuing to keep Cleveland in the lead in the competition for new members.

All members will be advised by card next fall that thereafter the only notice of the meetings will be in the Cleveland Engineering Society Bulletin.

Adsorption of refreshments followed.

E. V. COLLINS, *Secretary.*

●

MONTREAL BRANCH

The regular monthly meeting was held on June 10th in the Mount Royal Hotel. The new President G. R. Davidson opened the

meeting. There were 20 members present, a 50 per cent increase over last month.

Librarian J. T. Reisenberg read a paper on "Chromium Plating" by Mr. L. F. Train, Metallurgical Engineer of Pratt & Whitney Corporation. This was followed by a discussion of the questions in the REVIEW from the Sydney Branch.

It was decided to present all Past Branch Presidents with the appropriate membership pins. A hearty vote of thanks was tendered Mr. J. T. Reisenberg of Lea Products for his donation of a fine monogrammed brief case for the use of the Branch Secretary.

Plans are being laid to hold a Banquet in September to start the Fall program off with a bang.

WILLIAM GLOVER, *Secretary.*

●

DAYTON BRANCH

A special meeting was held on Friday, May 17th at the Engineers Club to elect Branch Officers for the years 1946 and 1947. The new officers are:

President—Walter E. Moline (re-elected)

First Vice-President—John F. Beaver, Jr. (re-elected)

Second Vice-President—Frank J. Klein

Secretary and Treasurer—Ralph L. Clinefelter (re-elected)

Librarian—Stephen Putzan

Board of Managers—E. L. Luaces (re-elected), L. A. Critchfield, and Forrest Valentine

Two applications were read and passed for the second reading, one was read and passed for the first reading.

There will be a Stag Party during the latter part of July.

RALPH L. CLINEFELTER,
Secretary-Treasurer.

●

SPRINGFIELD BRANCH

The April meeting was held at the Hotel Charles on Monday the 22nd.

Librarian F. L. Clark introduced Mr. R. J. Green of the R. J. Green Co., Waterbury, Conn., who gave a very interesting talk on "Modern Methods of Polishing and Buffing." He discussed the spray method of applying buffing compounds while the buffing wheels are in use and described the setting up of polishing wheels and belts by spraying the abrasives. The talk was followed by a discussion period.

One new member was elected and there were three applications.

The following members were elected to represent the Branch at the Pittsburgh Convention: Delegates—Arthur Zavarella, F. J. Clark, and John E. Costigan; Alternates—P. W. Prouty, Norman Plank, and William Seidel.

PAUL F. LYMAN, *Secretary.*

●

LOS ANGELES BRANCH

The Los Angeles Branch held its regular dinner and meeting on June 10 with 45 members and visitors attending. Among the visitors were: Paul Douglas of Bendix Aviation, James F. Tuchscher of O'Keefe and Merritt, Roy Warner of Fine Metal Finishing, J. R. McQueen of A. J. Lynch Co., and E. E. Lund and Carl E. Lund of J. J. Seifen Company.

A paper entitled "The Properties and Application of Cold Setting Cements" was delivered by Mr. Carl E. Lund of the J. J. Seifen Company of Detroit. It precipitated a lively discussion and a shuttling of questions and answers across the room. The acoustics being unfavorable for the soft voices of both the speaker and Librarian Gilbert Extale, a committee consisting of Earl Coffin, Don M. Bedwell and Al Speser was appointed by President D. N. Eldred to investigate the advisability of purchasing a public address system.

While this writer was enroute to the National Convention at Pittsburgh, Frank Bunker proxied as Secretary-Treasurer and did a bang-up job of collecting dues and handling the many details involved.

Mr. Bunker reported that Barney Lebb was injured while in service in the Navy and is spending most of his time convalescing in the Veteran's Hospital at Sawtelle.

C. C. McLaren was reported recovering from a plating room accident.

Bob Gripp was reported in improved health and out of town for a rest. Subse-

quently his health turned for the worse and forced him to return to Los Angeles where on the night of June 28, our old faithful and beloved member passed away.

Four new members were initiated. There was one suspension.

E. R. HOLMAN, *Sec'y-Treas.*

●

CHICAGO BRANCH

The regular meeting was held on Friday, June 14th. Another change in the meeting place brought us back to the Atlantic Hotel where we had been for many years prior to the War.

Dr. Winston M. Manning of the University of Chicago addressed the group on the "Heavy Elements," chiefly the fissionable materials that have recently been prominent in scientific news of the atomic bomb. He covered quite thoroughly the scientific aspects of uranium, neptunium and plutonium and indicated that a new series of elements, analogous to the lanthanide series but known as the actinide series, could be postulated from these new elements due to the similarity of their chemical properties. Methods for the production of some of these elements were touched upon, and the possibility of using such reactive materials for industrial power was discussed. One of the most interesting features of the talk was the description of an extremely sensitive balance and other pieces of micro-chemical apparatus designed to handle microscopic amounts of these materials.

Since the topic was of far more general interest than the usual technical discussions of electroplating and metal finishing, ladies were specifically invited to this meeting. More than 80 members and their wives attended and their active interest was shown by the discussion which followed.

G. STUART KRENTEL,
REVIEW *Correspondent.*

●

SAN FRANCISCO BRANCH

Nineteen members attended the meeting on June 11 at Victor and Roxies Cafe in Oakland. Two applicants were unanimously approved for membership.

Mr. Wooley, Lost Angeles District Manager of United Chromium Incorporated, delivered a very interesting and instructive talk on "Unichrome Copper." A board with plated samples was shown. Mr. Wooley stressed the simplicity and the ease of control of the bath which does not contain wetting agents or organic brighteners. The members present were impressed with the beautiful luster of the unbuffed samples. Considerable discussion followed concerning the application of this process to job shop plating.

F. HUNTINGTON, *Sec'y-Treas.*

●

SOUTHEASTERN BRANCH

The first meeting was called to order at 9:00 P. M. on Friday, May 10 at Robert Fulton Hotel by R. E. Norman, Acting Chairman.

The following prospective members were introduced: M. E. Awtrey, Clarence Estes, Elmer Estes and Roy Little of the Simmons Plating Works; Durwood Smith of Walker Electric Co.; William Weymouth of Pullman Co.; Clem Hohner of The Udylite Corp.; Mr. Hereford of International Chemical Co.; Paul Stevens of Southern Electroplating Co.; Alvin Christian, H. R. Stogner and R. E. Norman of Atlanta Plating Works.

The Acting Chairman stated the purpose of the meeting and stressed the value of having a chapter of the AES in Atlanta and the South. He emphasized its educational value to members and listed the qualifications for membership. All present took part in a general discussion of organizational plans. After R. E. Norman had been elected Temporary Chairman, it was decided that personnel in nearby cities be contacted on membership and Mr. Norman was instructed to prepare and mail the necessary letter. No decision was reached as to name and meeting place for the Branch. Election of officers will be held at the second meeting on Thursday, May 16, at 7:00 P. M.

●

PHILADELPHIA BRANCH

At the June meeting, six applications were referred to the Board of Managers and five applicants were elected to member-

ship. There was one in-transfer from Newark Branch and one resignation.

Librarian Hirsch introduced the speaker of the evening, Mr. Arthur S. Kohler, Chief Chemist of Frederick Gumm Chemical Co. In his talk on "Cleaning of Aluminum," Mr. Kohler brought to those present a clear cut picture in the platers' language of how to clean wrought, heat-treated, and flux contaminated aluminum with both alkali and acid.

The speaker not only answered questions after the lecture but during the lecture. We had quite an appreciative group.

There will be a dinner meeting in September for members and guests.

The Annual Meeting and Banquet will be held in November. George Gehling was appointed Chairman and will pick his own committee.

Delegates Long and Mentzer reported on the educational features of the Convention. In their opinion and that of the other convention visitors who were present, the Brenner-Sidell paper on "Electrodeless Nickel" was outstanding.

PAUL MENTZER, SR., *Secretary.*

•

COLUMBUS BRANCH

A business meeting was held in the Battelle Memorial Institute Auditorium on Friday, June 28 for the purpose of arranging a program for the coming year. Various subjects were discussed and the following program was agreed upon:

August—No meeting
September—Meeting at Westinghouse Electric, Mansfield, Ohio
October—Dinner meeting at Hoffman's Garden, wives to be included
November—Joint meeting with Columbus Technical Council
December—Not arranged
April—Joint meeting with Columbus Technical Council

The meeting time was voted changed to the first Friday of each month.

Cloyd A. Snavely was elected Recording Secretary for the coming year.

DAVID S. STOKER, *Sec'y-Treas.*

New Branch Formed

The Executive Board at its meeting on June 16th unanimously approved the grant of a Temporary Charter to a group of twenty-two men in Atlanta, Georgia. The new branch will be known as the Southeastern Branch.

At the organization meeting on May 23rd this group had elected the following officers:

President, R. E. Norman, Atlanta Plating Works; First Vice-President, M. E. Awtrey, Simmons Plating Works; Second Vice-President, Darwood Smith, Walker Electric Company; Secretary-Treasurer, William T. Weymouth, Pullman Company; Librarian, Clem Hohner, The Udylite Corporation; Board of Managers, H. R. Stogner, Atlanta Plating Works; John Morris, Simmons Plating Works; and Mr. Cartlege, Scripto Manufacturing Company.

The Society has high hopes for the success of the new Branch which should fill a real need in its part of the country.

Pinner Appointed Chairman of Committee on Constitutional Revision

President Frank K. Savage announces the appointment of Past President Walter L. Pinner as Chairman of the Committee on the Revision of the Constitution, which was authorized at the recent A. E. S. Convention in Pittsburgh. Mr. Pinner has accepted "against his better judgment."

DAYTON BRANCH MEMBER RETURNS FROM A.A.F. OVERSEAS MISSION

The Army Air Forces Tropical Science Mission, of which Lt. Comdr. H. J. Huester, U. S. Navy Bureau of Aeronautics Technical Representative was a member, recently returned to Wright Field after flying 60,000 miles around the Equator and Pacific Area in a C-54 Douglas Skymaster. The mission was overseas four months to study the prevalent causes of deterioration to Air Forces, Quartermaster and Signal Corps equipment in tropical regions.

Commander Huester is a member of the Dayton Branch.

BRANCH DIRECTORY

and

A. E. S. OFFICERS

President ..... F. K. SAVAGE
The Kuehne Manufacturing Company, Mattoon, Ill.
First Vice-President ..... K. M. HUSTON
3208 Tyndale Avenue, Baltimore, Md.
Second Vice-President ..... SAM S. JOHNSTON
Weirton Steel Company, Weirton, W. Va.
Third Vice-President ..... ARTHUQ W. LOGOZZO
184 South Main Street, W. Hartford 7, Conn.
Past President ..... W. L. PINNER
Houdaille-Hershey Corporation, Detroi 11, Mich.
Executive Secretary ..... A. K. GRAHAM
P. O. Box 168, Jenkintown, Pa.

ADELAIDE, AUSTRALIA. Acting Secretary G. N. Dixon, G. P. O. Box 428D, Adelaide, Australia.

BALTIMORE-WASHINGTON meets first Tuesday of each month, in October, December, February and April at the Engineers' Club, Baltimore, Md, and in November, January, March and May at Kenesaw Apts, Washington, D. C. Secretary-Treasurer, L. G. Tubbs, 7011 Kenleigh Road., Baltimore 12, Md.

BOSTON meets first Thursday each month at Hotel Statler, Boston, Mass. Secretary, A. W. Garrett, 85 Rosemont Street, Dorchester, Mass.

BRIDGEPORT meets first and third Friday of each month at Barnum Hotel. Secretary-Treasurer, Joseph G. Sterling, 134 Colony Street, Bridgeport 8, Conn.

BUFFALO meets second Friday of each month at Hotel Statler, Buffalo, N. Y. Secretary, J. A. Kushner, 316 Winslow Avenue, Buffalo, N. Y.

CHICAGO meets second Friday of each month at 8 P. M., at Atlantic Hotel. Secretary, M. H. Longfield, 1528 S. 61st Avenue, Cicero 50, Ill.

CINCINNATI meets on second Wednesday of each month at 8 P. M., at the Engineering Society Headquarters, McMillan Street and Woodburn Avenue, Cincinnati, Ohio. Secretary-Treasurer, Charles Nuzum, Schaible Co., Summer St., Cincinnati 4, Ohio.

CLEVELAND meets first Saturday of each month at Cleveland Hotel. Secretary-Treasurer, Ernest V. Collins, 12436 Tuscora Avenue, Cleveland 8, Ohio.

COLUMBUS meets first Friday of each month at the Battelle Memorial Institute Auditorium, 505 King Avenue, Columbus 1, Ohio, at 8 P. M. Secretary, David S. Stoker, 1338 Meadow Road, Columbus 8, Ohio.

DAYTON meets second Friday of each month at the Engineers Club, Dayton, Ohio. Secretary-Treasurer, Ralph L. Clinefelter, West Milton, Ohio.

DETROIT meets the first Friday of each month at the Hotel Statler. Secretary-Treasurer, F. L. Clifton, 16536 Inverness, Detroit 21, Mich.

GRAND RAPIDS meets second Friday of each month, 7:30 P. M., at the Rowe Hotel. Secretary, R. Perkins, 916 Fairmount Street, S. E., Grand Rapids 6, Mich.

HARTFORD meets third Monday of each month at Hotel Garde, Hartford, Conn. Secretary, F. W. Smith, 46 Cottage Street, Meriden, Conn.

BRANCH DIRECTORY

(*Continued from preceding page*)

INDIANAPOLIS meets first Wednesday of each month at Fox Steak House, 1207 Washington Street. Secretary-Treasurer, Thomas C. O'Nan, 545 Fletcher Avenue, Indianapolis, Ind.

JACKSON-LANSING meets second Tuesday of each month alternating between Home Dairy at Lansing and Hotel Hayes at Jackson. Secretary-Treasurer, William H. Bennett, 253 Maplewood Drive, East Lansing, Mich.

LANCASTER meets second Friday of each month at 8 P. M., at Thaddeus Stevens Industrial School, Lancaster, Pa. Secretary-Treasurer, H. Clay Brubaker, 881 Manor Street, Lancaster, Pa.

LOS ANGELES meets second Monday of each month, at 6:30 P. M., at Hotel Cabrillo, 11th and Broadway. Secretary-Treasurer, E. R. Holman, P. O. Box 2649, Terminal Annex, Los Angeles 54, Calif.

MELBOURNE, AUSTRALIA. Secretary, L. A. Francis, G. P. O. Box 4502.

MILWAUKEE meets first Friday of each month at the Red Arrow Club, 774 N. Broadway. Secretary-Treasurer, James Durnford, 2370 N. 32nd Street, Milwaukee 10, Wis.

MONTREAL meets second Monday of each month at Mount Royal Hotel, Montreal, Quebec, Canada. Secretary-Treasurer, William L. Glover, 754 Second Avenue, Verdun 16, Quebec, Canada.

NEWARK meets first and third Friday of each month at Hotel Robert Treat, Newark, N. J., at 8 P. M. Secretary-Treasurer, George Wagner, 1130 S. Long Avenue, Hillside, N. J.

NEW HAVEN meets second Tuesday of each month alternating between Sterling Chemistry Laboratory, Yale University, and Hotel Taft. Secretary-Treasurer, B. J. Gaffney, 40 Filbert Street, Spring Glen, Hamden 14, Conn.

NEW YORK meets second and fourth Fridays of each month, in the Hotel Pennsylvania, 7th Avenue and 33rd Street, New York, N. Y. Secretary-Treasurer, Franklyn MacStoker, 25 Princeton Street, Garden City, L. I., N. Y.

PHILADELPHIA meets fourth Friday of each month, in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Streets. Secretary, Paul Mentzer, Sr., 7242 Bingham Street, Philadelphia 11, Pa.

PITTSBURGH meets third Thursday of each month at 6:30 P. M., at the Roosevelt Hotel, Pittsburgh, Pa. Secretary-Treasurer, R. A. Dimon, 210 Semple Street, Pittsburgh 13, Pa.

PROVIDENCE-ATTLEBORO meets the third Monday of each month at the Providence-Baltimore Hotel. Secretary-Treasurer, Charles C. Chace, 11 Friendly Road, Cranston 10, R. I.

ROCKFORD meets second Monday of each month at the Faust Hotel, Rockford. Secretary, E. J. Budden, 122 Twelfth Street, Rockford, Ill.

ROCHESTER meets third Friday of each month at the Hotel Seneca, Rochester, N. Y. Secretary-Treasurer, R. Flint, 78 Durand Drive, Point Pleasant, N. Y.

SAN FRANCISCO meets the second Thursday of each month, usually at Angelo's, 4307 San Pablo Avenue, Oakland, Calif. Secretary-Treasurer, F. W. Huntington, 1621 Lafayette St., Alameda, Calif.

SPRINGFIELD meets the fourth Monday of each month at the Hotel Charles. Secretary-Treasurer, Paul Lyman, Millers Falls Company, Greenfield, Mass.

ST JOSEPH VALLEY. Secretary, Raymond A. Friend, 1435 Howard Street, Niles, Mich.

ST. LOUIS meets first Friday of each month at Central Y. M. C. A., 16th and

BRANCH DIRECTORY

(Continued from preceding page)

Locust Streets. Secretary-Treasurer, E. R. Hunleth, 4415 Michigan Avenue, St. Louis, Mo.

SOUTHEASTERN. Secretary, William T. Weymouth, 173 Clay St. S. E., Atlanta, Georgia.

SYDNEY, AUSTRALIA. Secretary-Treasurer, Lawrence Smith, Box 2064, G. P. O., Sydney, Australia.

SYRACUSE meets second Friday of each month at Bowne Hall, Syracuse University, Syracuse, N. Y. Secretary, Neil Maffei, 206 Union Avenue, Syracuse 3, N. Y.

TOLEDO meets first Thursday of each month at the office of Vic Miner Company, 329 20th Street, Toledo, Ohio. Secretary, Gaston Bergeman, 703 Pine Street, Fremont, Ohio.

TORONTO meets second Friday of each month at Royal York Hotel. Secretary, Leonard W. Wray, 105 Ronan Avenue, Toronto 12, Ont., Canada.

TWIN CITY meets first Monday of each month, October through June, at the Covered Wagon Cafe, Lodge Room, 114 S. 4th Street, Minneapolis. Secretary-Treasurer, Robert L. Buckley, 318 Builders Exchange, Minneapolis 2, Minn.

WATERBURY meets second Friday of the month at Elton Hotel. Secretary-Treasurer, Spencer L. Henn, Apothecaries Hall Company, Waterbury 88, Conn.

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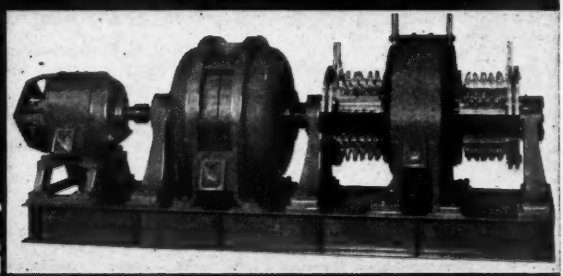

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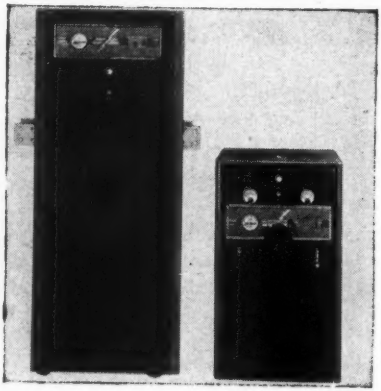

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Chairman, Membership Committee

ELECTIONS

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Carl Berger, 250 N. Main St., Oberlin, Ohio

Stayton G. Todd, 222 32nd St. N. W., Canton 3, Ohio

SAN FRANCISCO BRANCH

Roy A. Whitsitt, 658 24th St., Oakland, California

Edward F. Wall, Kem Plating Works, 10 Tenny Place, San Francisco, Calif.

Fuller E. Weston, Braun-Knecht-Heimann Co., 1400 16th St., San Francisco 19, California

COLUMBUS BRANCH

Arch B. Tripler, 505 King Ave., Columbus 1, Ohio

Harry G. Ingle, 2445 Sullivant Ave., Columbus, Ohio

NEW YORK BRANCH

Carl M. Cartledge, Scripto Mfg. Co., 423 Houston St. N. E., Atlanta, Ga.

Fred C. Wagner, Jr., 23 Sperry St., New Hyde Park, N. Y.

Saul Linsider, 1780 E. 13th St., Brooklyn, New York

Charles Weiner, 757 Empire Blvd., Brooklyn 13, N. Y.

PHILADELPHIA BRANCH

Warren Hobson, 7734 Gilbert St., Philadelphia 19, Pa.

Richard G. Snyder, 529 Ninth Ave., Bethlehem, Pa.

E. A. Backlund, Telegrafverkets Verkstad, Nynashamn, Sweden

Marcel Ballay, 41 Ave. Friedland, Paris 8e, France

Roland R. Foulke, 444½ Hanover Ave., Allentown, Pa.

LOS ANGELES BRANCH

Fenton F. Jones, 1045 N. Mission Rd., Los Angeles 33, Calif.

Clif L. Grace, 1045 Mission Rd., Los Angeles 33, Calif.

Elburn D. Marcum, E. I. du Pont de Nemours & Co., P. O. Box 70, El Monte, California

Kenneth A. Holden, 135½ W. 38th St., Los Angeles 37, Calif.

TORONTO BRANCH

George E. Bisson, Coro (Can.) Ltd., 604 King St. W., Toronto, Canada

CHICAGO BRANCH

C. Kolzow, 400 Prospect St., Elmhurst, Illinois

L. Zinn, 609 Fulton St., Chicago 6, Ill.

M. Zinn, 1621 W. Division St., Chicago 22, Illinois

PITTSBURGH BRANCH

Perry T. Thomas, 5639 Rural St., Pittsburgh, Pennsylvania
Edwin H. Engel, Irvin Works, Carnegie-Illinois Steel Corp., Dravosburg, Pa.
T. George Timby, R.D.1, Beaver, Pa.
Arthur F. Kaupe, 5834 Ellsworth Ave., Pittsburgh 6, Pa.
Harry E. McCune, Westinghouse Electric Corp., Sec. U1, East Pittsburgh, Pa.
A. K. Mock, Box 480 R.D. No.1,Turtle Creek, Pa.
Rudolph H. Schingler, 2034 Perry St., Ellwood City, Pa.
Albert R. Bugel, 411 Caroline St., Munhall, Pa.
Joseph E. Bugel, 158 W. Marietta St., Munhall, Pa.

DAYTON BRANCH

Lawrence D. Ridenour, Buckeye Bumper Div., Electric Auto-Lite Corp., Springfield, Ohio

BRIDGEPORT BRANCH

William F. Sileo, Stamford Polishing Co., 83 Jefferson St., Stamford, Conn.
Rocco M. Sileo, Stamford Polishing Co., 83 Jefferson St., Stamford, Conn.
Michael Milo, 15 Charles St., Noroton Heights, Conn.
Frank P. Leonard, 122 N. Water St., East Portchester, Conn.
George W. Herbert, 81 Haseco Ave., Portchester, N. Y.
George J. Eckholm, P.O. Box 155, Trumbull, Connecticut

TWIN CITY BRANCH

James H. Brooks, 253 Plymouth Bldg., Minneapolis, Minn.

APPLICATIONS

CLEVELAND BRANCH

Arthur D. Swindell, Ardell R.F.D. No. 3, Alliance, Ohio
Daniel Gurovich, 4689 E. 85th St., Cleveland 5, Ohio

NEW YORK BRANCH

Nelson E. Myers, Enequist Chemical Co., Brooklyn, N. Y.
George Cooperman, Arc Anodizing & Plating Corp., L. I., N. Y.
Raymond De Buyer, Societe de Traitements Electrolytiques, Paris, France

CHICAGO BRANCH

G. Duncan, 903 E. 81st St., Chicago 19, Illinois
J. Russell, 1949 N. Cicero Ave., Chicago 39, Illinois

BRIDGEPORT BRANCH

William R. Porter, Jr., 80 Regent Terrace, Devon, Conn.

NEWARK BRANCH

George Jellinek, Lynn Products, Inc., 945 South Ave., Plainfield, N. J.

TRANSFERS

F. L. Oldroyd from Philadelphia Branch to Southeastern Branch
R. C. Bender from Grand Rapids Branch to Chicago Branch
C. L. Ricketts from Cleveland Branch to Chicago Branch
D. Reid from Chicago Branch to St. Joseph Valley Branch

RESIGNATIONS

CLEVELAND BRANCH

Ralph G. Kennedy, Jr.
Royal F. Strickland
Tully S. Hammer
Frank Hovorka

COLUMBUS BRANCH

Wilson B. Green

LOS ANGELES BRANCH

Mac T. Munnell

TORONTO BRANCH

A. E. Cummings

PITTSBURGH BRANCH

John P. Huch

BRIDGEPORT BRANCH

John Brown

SUSPENSIONS

NEWARK BRANCH

Joseph Ryder
Hy Libowitz
Ellwood Neuer

Joseph Phillips
Russel K. Johnston
Raymond Housel
James P. Boitana
John D. Dyer

LOS ANGELES BRANCH
Jack Wiseman

REINSTATEMENTS

COLUMBUS BRANCH
Stephen E. Timmons

ST. JOSEPH VALLEY BRANCH
Sterling Wiener

GRAND RAPIDS BRANCH
Walter F. Hamacher

DEATHS

NEWARK BRANCH
Harry J. Maurer

LOS ANGELES BRANCH
Robert Gripp

CHICAGO BRANCH
D. English

NEW YORK BRANCH
Frank M. Koeble

INSTRUMENT SOCIETY TO HOLD CONFERENCE

The First National Instrumentation Conference and Exhibit, sponsored by the Instrument Society of America, will be held on the 17th floor of the William Penn Hotel, Pittsburgh, Pa., on September 16–20.

Fourteen sessions of the Conference have been scheduled by the Society and three sessions have been arranged by the Instruments and Regulators Division of the American Society of Mechanical Engineers.

Among papers of particular interest to the plating industry are those to be presented at the sessions on "Inspection and Testing," namely: Surface Finish Standards, by W. Mikelson, General Electric Company; Surface Measurement Instrumentation, by James A. Broadston, North American Aviation, Inc.; Recent Trends in Electric Gaging Methods, by Howard Roberts, University of Illinois; and Supersonic Inspection, by J. W. Dice, Sperry Products, Inc.

To date, more than ninety leading instrument manufacturers have engaged space. Attendance at the Conference and Exhibit will be restricted to holders of special invitations, which can be obtained from the Secretary, Instrument Society of America, 1117 Wolfendale Street, Pittsburgh 12, Pa.

RUBBER PRODUCTION TO INCREASE

Under the operation of the Malayan Rubber Estate Owners' Company, natural rubber production on United States Rubber Company plantations in Malaya will approach 50 per cent capacity by the end of 1946.

This fact was revealed by Wallace E. Cake, assistant director of the company's plantation division, at a recent meeting of the New York Rubber Group, American Chemical Society.

According to Mr. Cake, actual production on company plantations in Malaya reached 411,982 pounds during the first quarter of 1946. Quarterly production is expected to rise to 2,930,000 pounds during the fourth quarter of the year. Estimated total output for the year is 8,400,000 pounds.

Before the war, the United States Rubber Company operated 102,000 acres in Malaya and Sumatra, with a capacity of 75,000,000 pounds of natural rubber yearly. Of this total, the company's Malayan estates comprised 28,770 acres and produced 24,000,000 pounds of rubber annually.

MEMBERSHIP CHART

BRANCH	May 1946	Change in Membership	Percent Change
FIRST GROUP			
BRIDGEPORT	124	+ 9	+ 7.3
NEW YORK	201	+ 10½	+ 5.2
PHILADELPHIA	170	+ 6	+ 3.5
TORONTO	131	+ 3	+ 2.3
LOS ANGELES	181	+ 4	+ 2.2
WATERBURY	128	+ 2½	+ 2.0
HARTFORD	134	+ 2½	+ 1.9
CHICAGO	359	+ 5	+ 1.4
BOSTON	168	+ 1	+ 0.6
CLEVELAND	177	− 2½	− 1.4
NEWARK	243	− 8½	− 3.5
DETROIT	440	− 20½	− 4.7
SECOND GROUP			
INDIANAPOLIS	90	− 9	+ 10.0
PITTSBURGH	97	+ 7½	+ 7.7
SYDNEY	82	+ 5	+ 6.1
DAYTON	87	+ 3	+ 3.4
GRAND RAPIDS	116	+ 1½	+ 1.3
BUFFALO	87	+ 1	+ 1.1
SPRINGFIELD	82	....	....
JACKSON-LANSING	85	....	....
ROCHESTER	97	....	....
BALTIMORE-WASH.	114	....	....
MILWAUKEE	120	....	....
ST. LOUIS	122	....	....
PROV.-ATTLEBORO	122	− 1	− 0.8
NEW HAVEN	110	− 3	− 2.7
THIRD GROUP			
SYRACUSE	64	+ 5	+ 7.8
SAN FRANCISCO	84	+ 6	+ 7.1
ST. JOSEPH VALLEY	60	+ 2½	+ 4.2
TWIN CITY	72	+ 3	+ 4.2
COLUMBUS	34	+ 1	+ 2.9
LANCASTER	38	+ 1	+ 2.6
ADELAIDE	37	....	....
ROCKFORD	53	....	....
CINCINNATI	58	....	....
MELBOURNE	59	....	....
TOLEDO	60	....	....
MONTREAL	61	− 7	− 11.5

Membership May 1, 1946 = 4,527 — Gain in Membership = 47

Membership July 15, 1946 = 4,574 — Percent Gain = 1.0

DR. H. JERMAIN CREIGHTON HONORED

The Electrochemical Society has awarded the Edward Goodrich Acheson Gold Medal and Thousand Dollar Prize to Professor H. Jermain Creighton of Swarthmore College for his outstanding accomplishments in electrochemistry. This is the very highest award in electrochemistry.

Dr. Creighton was born in Dartmouth, Nova Scotia, on March 2, 1886. He attended Dalhousie University at Halifax, Nova Scotia, receiving his Bachelor of Arts degree in 1906 and his Master of Arts degree in 1907. He then was awarded a fellowship and spent the next two years at Birmingham, England, obtaining his Master of Science degree there in 1909. He next spent a year at Heidelberg University and another year at the Polytechnikum at Zurich, Switzerland, where he received his Doctor of Science degree. Returning to Dalhousie University, he lectured on physical chemistry until 1912 when he was invited to Swarthmore College, Pennsylvania. He has headed the Chemistry Department of Swarthmore since 1928. The Franklin Institute awarded him the Longstreth Medal in 1918; and the Howard N. Potts gold medal in 1939 in consideration of his distinguished work in developing a process for the electrolytic reduction of simple sugars on a commercial scale. In Dr. Creighton's process, glucose is converted into sorbitol. Sorbitol has two principal values: first, as a moistening and softening agent; second, as an intermediate in chemical synthesis. The most important derivative at present is ascorbic acid (vitamin C).

In 1940 the National Association of Manufacturers presented Dr. Creighton with the "Pioneer Award" on account of his work on sugars.

Dr. Creighton has been a very active member of the Electrochemical Society and has served as its President in 1939–1940.

Dr. Creighton is the author of one of the very best books on the *Principles of Electrochemistry*. It was originally published in 1924 and has gone through four editions.

The Acheson Medal and Prize was founded by Dr. Acheson, inventor of carborundum and artificial graphite. Previous recipients of the medal are Edwin F. Northrup, Colin G. Fink, Frank J. Tone, Frederick M. Becket, Francis C. Frary, Charles F. Burgess and William Blum.

The presentation of the medal to Dr. Creighton is scheduled for Thursday evening, October 17th, 1946 at Toronto, Ontario, in conjunction with the 90th Congress of the Electrochemical Society.

Robert Gripp

Fellow members mourn the passing away in the night on Friday, June 28, of this staunch supporter and devoted member of the Society. Robert Gripp was a charter member of the Los Angeles Branch and carried the distinction of having served as the first president of this Branch. A most genial fellow, he was always ready to go out of his way to help others, particularly platers, on any and every problem. His informal talks at the Branch meetings highlighted the evenings and attracted many new members to the Society. These discussions, though usually on technical subjects, revealed the warm human soul of this man. Forty-five of his fifty-nine years he devoted to the field of his calling and to its elevation in status from the electroplating art to a science. He was a member of the Masonic order. For the past twelve years he was employed by Cadmium and Nickel Plating Co. in the capacity of master plater. He is survived by his wife, a daughter, a brother and three sisters.

E. R. Holman.

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Make-Up Analysis Prosalt Copper Bath	*Cost*
Copper cyanide, 3.5 ounces per gallon	$0.0764
Sodium cyanide, 4.6 ounces per gallon	0.049
Sodium carbonate, 4.0 ounces per gallon	0.0075
PROSALT, 130 cc. per gallon	0.184
	$0.3169 per gallon

Ideal for copper strike; stop-off for heat treat; copper to be buffed—Sufficiently bright for direct deposit of bright nickel on polished surfaces.

Prosalt available f.o.b. Waukegan, Illinois, in twelve gallon carboys at $5.35 per gallon.

PRO-SEAL

Pro-Seal meets the refrigerator manufacturers' specification for shelf finish when applied to zinc plated shelves. Produces long lasting, beautifully brilliant finish on zinc plated shelves and parts. Pro-Seal creates thousands of new uses and applications of PROTECTED bright ZINC or CADMIUM plated products—suitable for use on barrel-plated parts—uses no current—simplifies production—can be hot rinsed or oven dried—easy to control and economical to operate.

ZINC AND CADMIUM

Promat Basic Addition Agents for zinc and cadmium baths now available for use with Direct Current. Allows use of higher current density resulting in an increase in the capacity of existing tanks.

THE PROMAT LINE

The Promat line also includes electro-cleaners for steel, die castings and aluminum, soak cleaners; Pre-treat for stainless steel; "Z" Black, concentrated electrolytes and maintenance solutions for zinc, cadmium and copper.

Representatives in principal cities. Write to:

PROMAT DIVISION—Poor & Company

851 SOUTH MARKET STREET WAUKEGAN, ILLINOIS

INDUSTRY NEWS

Rate of Plating Operations in New York

The May *Monthly Bulletin* of the Masters' Electroplating Association, New York City, reports: "The rate of operations among the members of the Association for May was 77½% compared with 76% for April, and 72% for May, 1945.

"Business volume continues to maintain a good level. Profits, however, are beginning to be a cause of some worry."

•

W. A. Givens, Steel Official, Succumbed Wednesday, May 29th

W. A. Givens, aged 60, of 224 S. Homewood Avenue, Pittsburgh, executive vice-president and director of Allegheny Ludlum Steel Corporation, died on Wednesday, May 29th, in Allegheny Valley Hospital, Tarentum.

Mr. Givens came to Allegheny Steel Company in 1925 as superintendent of the Merchant Mill, after many years of operating experience with other steel companies. In 1926, he was promoted to alloy production manager and two years later was appointed general superintendent, a position he held until 1932 when he was made general manager. In 1938, he was elected to the board of directors and was made vice-president in charge of manufacturing. In 1944, he was elected executive vice-president.

Mr. Givens was born November 7, 1885, in Pittsburgh, where he attended grammar and high school.

He was a director of the Western Pennsylvania Safety Council; president of the Allegheny Coal and Coke Company; a director of the Arnold Engineering Company of Chicago; a director of Wallingford Steel Company, Wallingford, Conn.; a director of the First National Bank in Tarentum; and a member of the American Iron and Steel Institute. He was also a member of the Syria Temple. Among his clubs were the Brackenridge Heights Country Club, Oakmont Country Club, Pittsburgh Athletic Association, and the Duquesne Club.

He is survived by his widow, Edith; one daughter, Mrs. Merle J. Graham of Pittsburgh; and two brothers, Howard M. and Earl V., both of Philadelphia.

•

Hooker-Detrex Corporation Formed

The Hooker-Detrex Corporation has been incorporated under the laws of the State of New York, with a capitalization of 6,000 shares of preferred stock and 1,500 shares of common stock.

This is a corporation jointly owned by Hooker Electrochemical Company whose main office is located at Niagara Falls, N. Y., and Detrex Corporation, whose main office is located in Detroit, Mich.

The corporation has been formed for the purpose of manufacturing chlorinated solvents, the distribution and sales of which will be handled by Detrex.

The officers of the Corporation include E. R. Bartlett, president; A. O. Thalacker, first vice-president; R. L. Murray, second vice-president; and G. E. Powers, treasurer.

The Board of Directors is composed of these four officers and in addition R. A. Emmett and H. M. Hooker.

The site for manufacturing operations will be located in the Pacific Northwest where various materials are available and from which point distribution to West Coast markets will be handled. It is understood that the location will be adjacent to the property now occupied by the Hooker Electrochemical Company in Tacoma, Washington, between Alexander Avenue and Hylebos Waterway.

Civilian Production Administration approval has been granted for the necessary construction work and it is anticipated that ground will be broken immediately.

●

J. D. Hamacher Appointed Detrex Plant Engineer

A. O. Thalacker, vice-president and general manager of Detrex Corporation, Detroit 32, Michigan, has recently announced the appointment of J. D. Hamacher as plant engineer.

Mr. Hamacher is a graduate of the University of Detroit and since joining Detrex, early in 1944, has been employed as design engineer in the oil-extraction division. His new duties include plant layout and supervision of maintenance of all Detrex properties and buildings.

●

Safety Research Institute, Inc. Elects Officers and Directors

Brahna Chalefman Hutchins has been elected president of Safety Research Institute, Inc., educational and public relations organization in various types of safety work. She was formerly a vice-president.

Other officers elected were Frank Arnoldi, vice-president; Robert Nathans, vice-president; and Angela B. Daniels, secretary and treasurer.

The four officers were also elected directors.

●

Lea Named Advertising Manager

Sydney L. W. Lea, recently released from active duty as an Army captain, has been named Manager of Advertising of the Pennsylvania Salt Manufacturing Company. At the same time Anne Hurlbrink was named Assistant Advertising Manager.

Mr. Lea succeeds Mrs. Ethel Serfas Klingman, who is retiring from business. He was assistant to George B. Beitzel, now vice-president in charge of sales, before joining the Army in 1940.

●

Bristol Company Appoints G. H. Gaites District Manager

G. H. Gaites, Regional Sales Supervisor of the Cleveland and Pittsburgh sales territories of the Bristol Company, was recently appointed district manager of the company's New York office, according to H. E. Beane, Sales Manager.

Mr. Gaites studied Electrical Engineering at Brooklyn Polytechnic Institute and was associated with the Brooklyn Edison Company as Test Engineer in the Operating Department from 1912 to 1917. After serving two years in the U. S. Army Coast Artillery, Mr. Gaites became associated with the Franklin Sugar Refining Company, Philadelphia, Pa., as Fire Prevention and Safety Engineer. In 1920, he joined the Bristol sales organization as Sales Engineer and was connected with the New York office until 1927 when he was appointed Sectional Sales Engineer, with headquarters in Cincinnati. In 1928, he was made district manager of the Bristol Philadelphia office and in 1935 was named managing director of Bristol's Instrument Company, Ltd., London, England.

Two years later, Mr. Gaites returned to this country to become district manager of the Bristol Pittsburgh office.

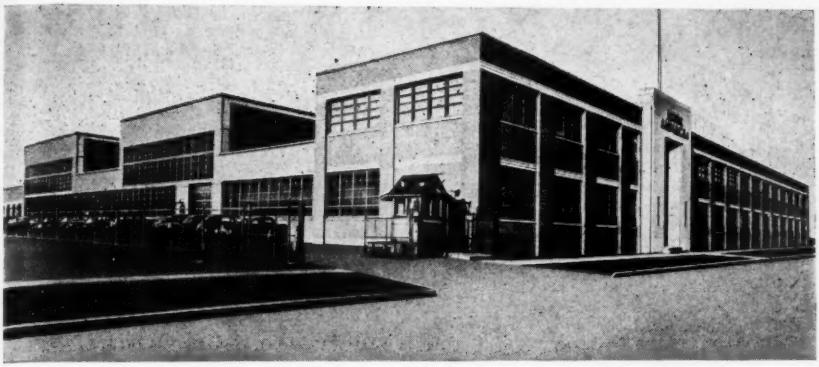
Mr. Gaites will make his headquarters at the company's New York office, located in the Fisk Building, 250 West 57th Street.

●

Detrex Opens New Branch at Grand Rapids, Michigan

Detrex Corporation, Detroit 32, Michigan, producers of industrial metal cleaning equipment and chemicals, has opened its new Grand Rapids office and warehouse at 435 Ionia Avenue, S. W., Grand Rapids 2, Michigan, according to an announcement made by A. O. Thalacker, vice-president and general manager.

The opening of this new office is part of a



general expansion program to meet the increased demand for Detrex products and services.

To meet this increased sales volume which is credited to the widespread use of Detrex metal cleaning equipment and chemicals by the automative, aviation, and other metal working industries, the main offices and plant headquarters are now located at 14331 Woodrow Wilson Avenue, Detroit, Michigan.

●

Safety Research Institute, Inc., Warns of Extinguisher Defects

The Safety Research Institute, Inc., New York, has issued the following precautions in regard to fire extinguishers:

Newly acquired extinguishers, supplied by sources other than the manufacturers or their authorized agency, should be thoroughly inspected before they are put into service, to make sure they are in operating condition. Those that show evidence of mishandling or deterioration may be dangerous to the user and may not function properly when needed. They should be reconditioned only by the manufacturer whose nameplate they bear.

The extinguisher shell, particularly in the case of soda acid and foam types, should be examined for dents caused by falls and for signs of weakening at the seams. Bulges in the shell indicate that the unit has been subjected to freezing or insufficient venting or pressure. Evidence of soldering or other makeshift repairs are also indications that the extinguisher may not be safe for use. Soda acid and foam extinguishers should be checked on hydrostatic testing equipment for their ability to withstand pressure to 350 pounds.

Rubber hoses should be examined for cracks or loss of flexibility, especially where substandard extinguishers bearing EAS approval are concerned. Made during the war, these "Emergency Approved" models were constructed of substitute materials which are subject to rapid deterioration. Porcelain enamel coatings, used on interior parts of EAS pump tanks and foam extinguishers, should be inspected for cracks.

Carbon dioxide extinguishers should be examined for corrosion, damage to the horn, clogging of the discharge nozzle, and damage to the valve. The extinguisher should be weighed to make sure the valve is still gas-tight. The cylinder should be subjected to hydrostatic test for its ability to withstand pressure to 3,000 pounds.

●

Benjamin Goldberg Receives High Service Award

Benjamin Goldberg, of the Bronx, N. Y., was recently presented the Exceptional Meritorious Civilian Service Award, the highest the War Department can confer, as a result of his notable work for the past five years as an optical physicist attached to the technical staff of the Army Engineer Board, Fort Belvoir, Va.

As assistant chief of the Engineer Board's Reflector Research Laboratory, the New York native won this recognition for his contribution to the technique of metal mirror reflector manufacture and for designing special reflectors for lighting and for other

Benjamin Goldberg (left) is shown with N. C. Benson, Chief of the Reflector Research Laboratory

optical devices, particularly for searchlights used extensively by the U. S. Army during the war.

Certain discoveries and developments made by Mr. Goldberg enabled the Army to reduce substantially the cost of metal reflectors. His work also lengthened the service life and improved the efficiency of this equipment, all of which contributed greatly to the maintenance of American superiority in the manufacture of instruments of this type.

One of his outstanding achievements during his five-year employment at the Board was the development of a new high-speed copper electroforming solution permitting the deposition of copper possessing a hardness index 2 1/3 times greater than that from the solution formerly used by the Army. This resulted in the production of reflectors of only one-half the weight of former ones without sacrifice of stiffness, rigidity, and optical qualities. It also reduced manufacturing time from 144 hours to a mere 20 hours, and at the same time saved critical materials.

•

H-VW-M Appoints New Salesmen

The Hanson-Van Winkle-Munning Co. Matawan, N. J., has augmented its field and

FOR SALE Available for Immediate Shipment

3—15,000/7500 AMPERE, 8/16 VOLT, **COLUMBIA ELECTRIC CO.** Motor Generator Sets. Separately Excited. Full Control Equipment. Write for full details.
4—5000/2500 AMPERE, 8/16 VOLT, **COLUMBIA ELECTRIC CO.** Motor Generator Sets. Separately Excited. Excellent Condition. Full Control Equipment.
1—5000/2500 AMPERE, 6/12 VOLT, **EAGER ELECTRIC COMPANY** Motor Generator Set. Separately Excited. Excellent Condition. Full Control Equipment.
1—2500/1250 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. INTERPOLE CONSTRUCTION. Separately Excited. Full Control Equipment. Excellent Condition.
2000/1000 AMPERE, 6/12 VOLT, **CONNECTICUT DYNAMO AND MOTOR COMPANY** Motor Generator Set. Separately Excited. Excellent Condition. Full Control Equipment.
1—1500/750 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. Separately Excited. INTERPOLE CONSTRUCTION. Excellent Condition. Full Control Equipment.
1—1500/750 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. Excellent Condition. Full Control Equipment.
1—1000/500 AMPERE, 6/12 VOLT, **CONNECTICUT DYNAMO AND MOTOR CO.** Motor Generator Set. Full Control Equipment. Excellent Condition.
1—1000/500 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING CO.** Motor Generator Set. BRAND NEW. Full Control Equipment. Excellent Condition.
1—750/375 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING CO.** Motor Generator Set. Excellent Condition. Full Control Equipment.
1—B-60 **ILG VENTILATING COMPANY,** Motor-driven Blower Unit. Multivane Rotor. Excellent Condition. Immediate shipment.

ANODIZING MOTOR GENERATOR SETS

1—1000 AMPERE, 50 VOLT, **CHANDEYSSON ELECTRIC CO.** SYNCHRONOUS-DRIVEN Motor Generator Set, complete with Exciter and Full Controlling Equipment.
1—500 AMPERE, 60 VOLT, **WESTINGHOUSE** Motor Generator Set, complete with Full Controlling Equipment.
2—600 AMPERE, 40 VOLT, **MOTOR GENERATOR CORPORATION** Motor Generator Sets. Excellent Condition. Full Controlling Equipment.
1—500 AMPERE, 24 VOLT, **HANSON & VAN WINKLE CO.** INTERPOLE TYPE Motor Generator Set. Excellent Condition. Full Controlling Equipment.

M. E. BAKER COMPANY 143 SIDNEY STREET CAMBRIDGE, MASS.

service force by the addition of three new men: Willard W. Boesewetter, Carroll A. Pickering and Eugene B. Hauser.

Mr. Boesewetter was graduated from the Milwaukee School of Engineering in 1940, with the degree of Bachelor of Science in Electrical Engineering. He was, prior to the war, engaged in the electrical manufacturing field, and from 1941 to 1943 was an instructor in the U. S. Army Forces, Aviation Engineering Cadet School. From then until 1946 he served in the U. S. Naval Reserve with the rank of Lieutenant. Mr. Boesewetter has

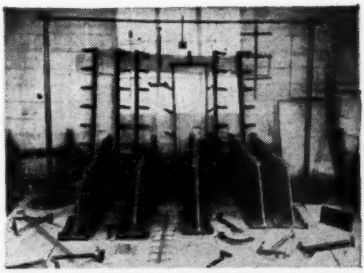
been assigned to the main office at Matawan, N. J., in electrical sales work.

Carroll A. Pickering was graduated from the University of Wisconsin, with the degree of Bachelor of Science in Chemistry

LONGER SERVICE LIFE
FOR
Electroplating Racks, Fixtures and Pipe Fittings, Electroplating Tanks

SEND TODAY for data sheet describing Industrial Lining thermoplastic coatings for the electroplater.

INDUSTRIAL LINING
Engineers, Inc.
EDGEWORTH, PENNSYLVANIA
SEWICKLEY POST OFFICE
Chicago, Ill., 20 N. Wacker Drive, Randolph 2326
Glenside, Pa., 18 N. Linwood Ave., Ogontz 5596
Canton, Ohio, P. O. Box 885, Canton 2-8620



Here is a semi-hard thermoplastic coating that is being used successfully by many electroplaters.

Compare these points of superiority with your present coating:

1. **Damaged surfaces can be repaired by you with a repair paste we furnish.**
2. **Service Life of 6 months to a year.**
3. **Immediate service.**
4. **Application thickness of 1-16" to 1-8" to meet your requirements.**
5. **Positive insulation preventing loss of metal, more uniform coating and less current.**
6. **Approved by electroplating consultants and suppliers.**

Synthetic Rubbers Bakelite Plastics Vinyl Thiokol Neoprene Polyethylene

and also took a specialized course in Industrial Chemical Engineering. Prior to the war he was employed by Fairbanks Morse and Co., as an electrochemist. Recently discharged from the United States Navy, Mr. Pickering has completed a special sales

training course at Matawan, and is now in the Chicago office as a field engineer.

Eugene B. Hauser was employed as a design engineer at the main office of the company from 1940 to May, 1942. From May, 1942 until April, 1946, he served with the United States Navy with the rank of Lieutenant. Following a special sales training course at Matawan, he has been assigned to the New York City office at 30 Church Street. Mr. Hauser is a graduate of Stevens Institute of Technology with the degree of Mechanical Engineer, having specialized in chemistry.

●

E. Reed Burns Representative Succumbs to Illness, June 17

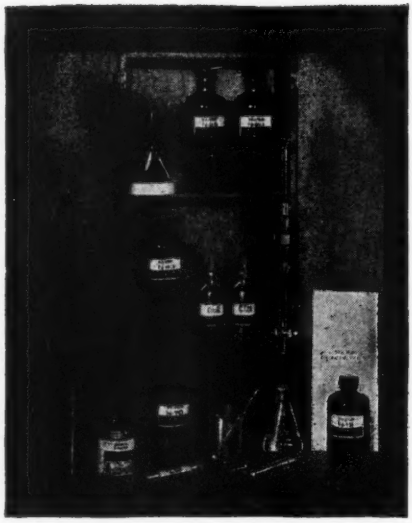
William R. Burns, of Beloit, Wisconsin, representative of the E. Reed Burns Manufacturing Corporation, Brooklyn, N. Y., died on June 17, after an illness of several months.

Mr. Burns had represented the Burns Company in the Wisconsin and Chicago territory since 1935.

●

New Lacquer Plant Opened by United Chromium Division

A large, modern lacquer plant was opened in Carteret, N. J., on June 13, by the Organic Coatings Division of United Chromium, Inc. This new plant is located



CHROMIUM
NICKEL
COPPER

Simple test sets for aid in controlling plating and other solutions.

Write for literature.

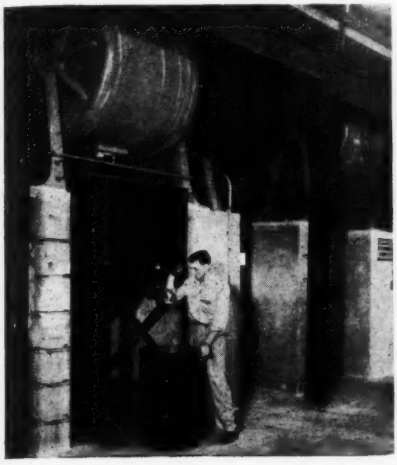
KOCOUR CO.

4725 S. CHRISTIANA AVE.
CHICAGO 32, ILL.

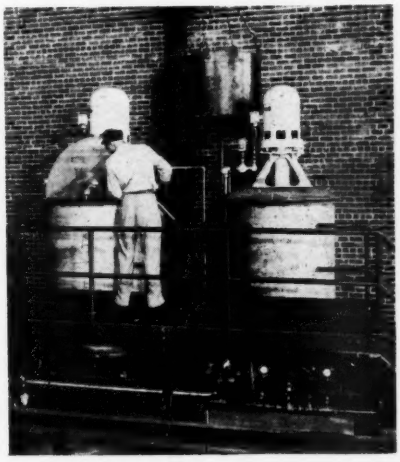
Specify Kocour Sets from your supplier.

among the buildings of the Metal and Thermit Corporation, of which United Chromium is a subsidiary. It replaces the lacquer plant United Chromium formerly operated in Waterbury, Conn.

The working area of the new plant is 22,500 square feet, and its present production capacity is approximately four times greater than that of the Waterbury plant. In de-



Pebble Mills, loaded from mezzanine, and unloaded into portable tanks on the main floor



High speed mixers, the most modern equipment of its type, mixes the lacquer ingredients faster and more uniformly. Materials are transported to the mixers by 60-foot span, overhead crane

THIS IS NEWS!

We actually have polishing and buffing lathes in stock (subject to prior sale).

Not a great many of these lathes but a fair variety, ranging from fractional horsepower bench lathes to 5 H.P. floor lathes.

☞ *First Come—First Served*

MUNNING MUNNING AND MUNNING Inc.

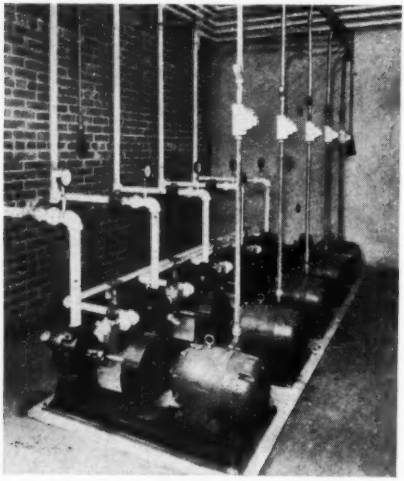
202 EMMETT ST. NEWARK 5, N. J.

Woolworth Bldg. NEW YORK

The Bourse Bldg. PHILADELPHIA

75 South St. WOONSOCKET, R. I.

signing the structure, emphasis has been placed on efficiency, safety and simplicity of operation, with provisions made for future expansion as business continues to increase.



Battery of automatic pumps to move solvents from five outdoor, 5000 gallon tanks to weighing platform

The plant includes a testing laboratory, air-conditioned laboratory, general research laboratory, heavy equipment laboratory, analytical laboratory and service laboratory. The testing lab includes such equipment as a six-foot water-wash, spray booth, a six-foot drying room, a lacquer dipping machine, a large infra-red drying bank, a salt spray testing cabinet and a humidity cabinet. The air-conditioned laboratory is equipped for close control of the humidity as well as the temperature.

The new plant will be managed by F. L. Scott who has been managing United Chromium's Waterbury plant since 1944. A. E. Whitney, who was with Dupont for five years, has been named Production Manager. The Supervisor of Technical Service is D. R. Meserve who formerly held the same position at Waterbury.

●

Frome and Eliason Become New Atlas Directors

W. G. Frome and T. M. Eliason were elected members of the board of directors of Atlas Powder Company at the board

ZINC PLATERS!

Use

McKEONS

Zinc-Brite

TRADE MARK REG'D.

to cleanse, and purify your zinc plating solutions.

Sample—full cooperation, free.

SULPHUR PRODUCTS CO., Greensburg 9, Pa.

meeting held July 3, according to Isaac Fogg, president.

Mr. Frome started in the explosives industry in 1910 and served in managerial positions at various Atlas explosives plants, finally becoming general manager of Atlas' Giant Division, San Francisco, Calif. Later he was transferred to Wilmington and appointed assistant general manager of the Explosives Department in 1943 and general manager last year.

He resides in Wilmington and is a member of the Wilmington Club and the Wilmington Country Club.

Mr. Eliason joined Atlas as chief clerk in the Accounting Department in 1913 when the company was organized. He became comptroller in 1922, assistant treasurer in 1927, and last year was elected treasurer.

He also resides in Wilmington.

●

Chester Manufacturing Company Incorporated April 8, 1946

Chester Manufacturing Company, Lisbon, Ohio, which has been operated for the past five years as a partnership, has found it necessary, in order to take adequate care of greatly increased business, to incorporate as Chester Hoist Company, effective April 8, 1946.

The officials are: President, Hal F. Wright (the founder of the business); vice-president, Mary T. Wright; and secretary-treasurer, Harry E. Hill.

It is claimed that the company is going to materially expand its line.

Just recently the company moved into a large new building, especially designed and built for the modern manufacture of chain hoists, trolleys, and allied products.

●

Davis Issues Technical Bulletin on Combustible Gas Alarm System

A new *Technical Bulletin* No. 1116 E, has been issued by Davis Emergency Equipment Company, Inc., 45 Halleck Street, Newark, N. J., on the Davis Combustible Gas Alarm System, a method for detecting and giving audible notification of hazardous gas or vapor conditions sometimes present during industrial processing operations.

This Bulletin describes the various combinations possible with this System and includes photographs showing the control panel, which is placed in a gas-free area, and the explosion-proof Analyzer Head which detects the presence of combustible gas or vapor at the point of origin. Included also is a description of the principle upon which the System operates, the method of operation, and a schematic diagram of a typical installation.

NOW AVAILABLE!

A. E. S. Research Report, Serial No. 1

"THE ADHESION OF ELECTRODEPOSITS"

Reprinted from Sept. '45–Jan. '46 issues, MONTHLY REVIEW

60-PAGE VOLUME, 60c.—DISCOUNT FOR QUANTITY

Send your order to

AMERICAN ELECTROPLATERS' SOCIETY

P. O. BOX 168 JENKINTOWN, PA.

Donald Keating Joins Turco

Turco Products, Inc., Los Angeles, Chicago and Houston, manufacturers of cleaning and maintenance compounds for every

industry, has announced the recent affiliation of Donald Keating with their Technical Service Staff.

A graduate of U.C.L.A. and California Tech., Mr. Keating served in the Navy as executive officer on an L.S.T. during World War II. He joins Turco as Technical Service Representative and will specialize in the solution of problems relative to cleaning and maintenance in the general industrial field.

●

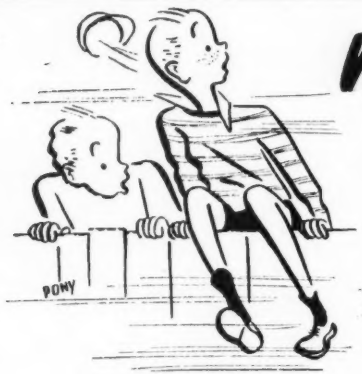
Latrobe Electric Steel Co. Names Assistant Sales Manager

Joseph E. Workman, at present Chicago, Illinois, district manager for Latrobe Electric Steel Company, Latrobe, Pa., has been appointed assistant sales manager for that company.

A native of Toledo, Ohio, Mr. Workman was employed by Logan Gear Co., of that city, before coming with Latrobe. He served in Latrobe's Toledo branch prior to being made manager of the Chicago branch.

Robert F. Frazure, who began with the firm as salesman in the Toledo office and became Toledo manager, will take Mr. Workman's place as Chicago district manager.

Ralph H. Bailey, who has been with the company since 1921, will move from his present position as Dayton, Ohio, manager, to district manager of the Toledo office.



WOW! that's speed!

In only a few seconds—clean and dry. That's the secret of the success and universal acclaim of Blakeslee Solvent Vapor Degreasers. A patented and entirely different cleaning process for metal parts and alloys giving 100% grease-free surfaces. Even pores, cracks, seams and massed parts come through thoroughly clean and grease-free. Write for facts.

BLAKESLEE
Solvent Vapor DEGREASERS
Metal Parts WASHERS

STANDARD AND SPECIALS Engineered for you

G. S. BLAKESLEE & CO., CHICAGO 50, ILLINOIS
NEW YORK N. Y. TORONTO, ONT.

NEW Equipment Materials Supplies

United Chromium Distributing Booklet on Organic Coatings

A new booklet on organic coatings entitled, *How to Pick a Winner*, has recently been made ready for distribution by United Chromium, Inc., 51 E. 42nd Street, New York 17, New York.

This informative 16-page booklet covers the sources, properties and applications of the many resins used in synthetic lacquers and protective coatings. The contents are aimed at providing valuable assistance to the user of these coating materials in answering questions on the suitability of one type of coating as against another for specific applications.

This booklet is available by writing United Chromium, Inc., at the above address.

●

New Oakite Pickle Control Made Available by Oakite

Oakite Pickle Control No. 3, a new addition to the group of specialized Oakite cleaning, inhibiting, and neutralizing materials now in use in pickling-room procedures, has recently been made available by Oakite Products, Inc.

A yellowish-brown, free-flowing powder with a density half that of water, the new material was designed primarily for inhibiting hot sulfuric-acid pickling solutions. It may also be used in mixed sulfuric-hydrochloric baths in which sulfuric acid predominates. Applications, according to the company, cover installations pickling many types of ferrous alloys and castings; hot and cold rolled steel; and also where pickling is done prior to plating or phosphate coating or where zinc coatings are stripped.

On the basis of field tests conducted during the last year in steel, wire, and rolling mills, and electroplating, galvanizing, and tinning shops, Oakite Pickle Control No. 3 is claimed to improve and economize the pickling cycle. Savings in metal, acid and maintenance costs have been reported, together with reduction in fuming, hydrogen embrittlement, pitting and discoloration of work. By retarding the build-up of iron sulfate in solution, the Oakite inhibitor is said to minimize the frequency and cost of spent liquor disposal.

Complete technical data, including performance graphs and instruction charts describing use and control of the new inhibitor by means of acid or ferrous-salt titration, are available without cost by writing on a letterhead to Oakite Products, Inc., 57 Thames Street, New York 6, N. Y.

●

Chemical Corporation Issues New Brochure on "Luster-on"

The Chemical Corporation, Springfield 5, Mass., has issued a new brochure on the LUSTER-ON process. In it the corporation announces an improved type of LUSTER-ON which is claimed to give brighter deposits in the same or shorter dipping time.

The brochure also announces the addition to the process of a LUSTER-ON Acid Replenisher which, it is said, greatly extends the life of the LUSTER-ON bath and reduces the cost of the process.

Another feature covered is the adaptation of the process to full automatic plating cycles. Through the use of a Conveyer

KIRK AND BLUM

FUME EXHAUST SYSTEMS

Are designed to meet your individual plant needs. They thoroughly remove fumes and vapors, guard workers' health, increase production and reduce costs.

Every K & B Fume Exhaust System is backed by 37 years of specialized engineering experience.

For further details write o

The KIRK & BLUM MANUFACTURING CO.

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"YANKEE BRAND"

PROGRESSIVELY BETTER ABRASIVE COMPOUNDS

Tailored to fit all finishing requirements.

Inquiries respectfully solicited

★

E. E. SEELEY COMPANY

(est. 1919)

Manufacturers
BUFFING COMPOSITIONS
FOUNDRY FACINGS

900 Housatonic Ave., Bridgeport, Conn.
Tel. 5-0943

Type LUSTER-ON Acid, the same results may be obtained in much longer dipping time—eliminating the need for delayed action transfers on the automatic plating.

●

New Brochure Issued By Electronic Controls

Electronic Controls, Inc, 44 Summer Avenue, Newark 4, N. J., has just released a brochure on its new Electronic Interval Timer Model 1029.

This new timer is said to be suitable for all industrial applications requiring precise time control. Housed in a cabinet 6 x 6 x 6 inches, Model 1029 has a time range from 0 to 2 minutes in one second steps, a better than 5% accuracy throughout its range, and controls loads to 500 Watts at 125V AC.

A copy of this brochure can be obtained by writing Electronic Controls, Inc.

●

Optimus Equipment Company Offers New Metal Part Washing Bulletin

A new, illustrated bulletin, (No. 6E1), describing standard models of metal cleaning and drying equipment manufactured by the Optimus Equipment, 131 Church Street, Matawan, N. J., has just been published.

Feature of the book is a table showing how seven basic type units can meet and handle twelve operating conditions. A minimum number of washing, rinsing, and drying machines adaptable to a large number of metal processing operations, are fully described.

The manufacturer states that Optimus parts washing equipment is designed for ease and speed of handling. Many of the units are movable, and all are planned to take up a minimum of floor space. They can be used in connection with a wide variety of systems, with the parts being brought to the machine on belts, racks, or in baskets.

The machines described in the bulletin are also adaptable, in many cases, for use in drying operations, using hot or cold air, and steam, gas, or electrical heating.

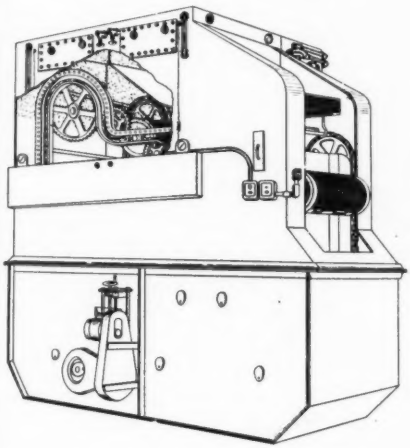
Optimus Detergents, a companion product, for the cleaning of both ferrous and non-ferrous metals, are also described in the bulletin.

New Type Vapor Degreaser

In addition to its present line of metal degreasing equipment, Detrex Corporation, Detroit 32, Michigan, has recently introduced a new standard conveyorized one-dip concentrator to the metal cleaning industr

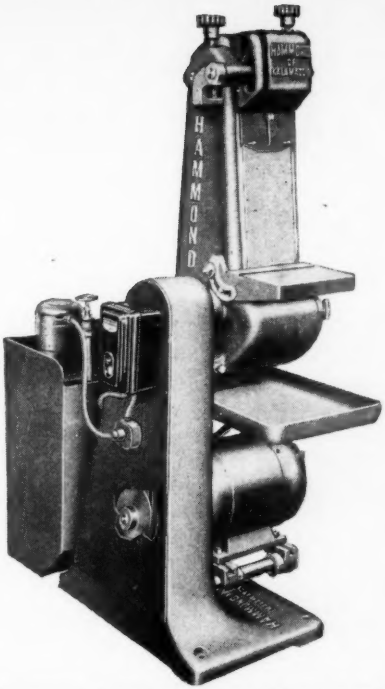
Called the "1 DC-750," this degreaser is small and compact. Designed to degrease small miscellaneous screw machine parts, it is claimed to be ideally suited to small shops where floor space is at a premium. The machine occupies less than 75 square feet of floor space and measures but 9 feet 9 inches in height.

The unit may be supplied with rotary or a combination of rotary and flat baskets. Rotary baskets are 10 inches diameter x 20 inches long. Work to be cleaned is loaded at one end of the degreaser, carried through the cleaning cycle, and is returned through the upper hood to the same end of the machine for unloading. The conveyor system



is complete with sprockets, shafts, take-up device, speed reducer and variable speed drive. All of the sprockets below the vapor line are zinc plated as are all crossrods and conveyor chains.

Detrex Corporation, manufacturers of metal parts washers, vapor degreasing solvents, alkali cleaners, and the equipment and solvent used in the dry-cleaning industry, is located at 14331 Woodrow Wilson, Detroit, Michigan.



Hammond Introduces New Abrasive Belt Grinders

Hammond Machinery Builders, Inc., Kalamazoo 54, Michigan, has for distribution its Bulletin 310, describing three new abrasive belt grinders which are claimed to have numerous valuable features. Some other applicable equipment and supplies are also listed.

When you write for your copy, mention the MONTHLY REVIEW.

●

Belke Issues New Catalog on Modern Plating Barrels

Modern Plating Barrels of all types and sizes are described and illustrated in a new catalog issued by Belke Manufacturing Company, 947 N. Cicero Avenue, Chicago 51, Illinois.

Information and specifications on barrels, from small lot to large multiple units, are given. Unusual construction features of Belke Barrels are detailed and materials used in making barrels for various types of plating are listed. Information on dryers, burnishing barrels and other plating equipment is also included.

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Variety of Duties Claimed for New WYCO Universal Hy-Speed Grinder

Grinding efficiency, combined with the greatest flexibility and convenience, is the claim for the new WYCO Universal Hy-Speed Grinder manufactured by Wyzenbeck & Staff, Inc., 838 W. Hubbard Street, Chicago, Ill.

This compact grinder can be set on a bench, hung from a hook, or suspended from the operator's belt, in case he desires complete mobility.

Three sizes are made for light, medium, and constant duty, in high speed grinding, burring, filing, sanding or polishing work from the smallest units up. Model 00-U, ½ h.p., free speed 16,000 r.p.m.; Model 000-U2 1/10 h.p., free speed 1800 r.p.m.; Model 000-U1 free speed 15,000 r.p.m. Motors are the Universal AC-DC type with toggle switch in base and rubber cord and plug.

Flexible shafts have the WYCO patented casing, oil-proof synthetic rubber-covered and innerlined with non-metallic graphite impregnated WYCO Innerliner, insuring a vibrationless, and true-running shaft.

Handpieces are cool running, with precision ball bearings, and interchangeable collets on all sizes.

Model 00-U is sufficiently rugged to be used with a tool post holder for light grinding in the lathe.

•

Bulletin on "Rota-Tronic" Issued by Fischer & Porter

A new bulletin issued by the Fischer and Porter Company, Hatboro, Pa., describes a low-flow rate measuring instrument named the Rota-Tronic, which measures drop-by-drop flow rates of liquids down to less than 5 milliliters per minute and for gases to less than 25 milliliters per minute. Rota-Tronic also automatically records, controls and totalizes. Attached to Rotameters, the device detects (by electronic means) the Rotameter float position and amplifies the minute electric current which actuates the recorder pen.

The manufacturer asserts that flow rates encountered in laboratory or pilot plant operations, as well as the small industrial

flow rates such as of perfume essence, vitamin additives, inhibitors and synthetic rubber mercaptan modifiers, now can be accurately and reliably recorded, controlled and totalized.

A copy of this new *Catalog 52-A* can be obtained by writing to Fischer and Porter Company, Dept. 8W-4, Hatboro, Pa.

●

New Detrex Spray Booth Compound

Detrex Corporation, Detroit 3, Mich., manufacturers of metal cleaning equipment and chemical cleaning compounds, announces a new product, Triad PR, a protective coating for spray booth side walls.

Triad PR, readily applied to the side walls of either wet or dry spray booths with brush or spray gun, provides a light-reflective finish that withstands mild abrasion. This white brilliant surface improves visibility in the booth and is easily flushed off with water or steam carrying all surface deposits with it, so it is claimed.

PR aids in the speedy stripping of paint from conveyor hooks and spray booth louvers. The removal of grit in the vitreous enameling field is also one of the various other applications of Triad PR.

Detrex also manufactures Triad WSF, a water conditioner for use in the water of wet spray booths. Triad WSF removes the adhesive qualities from all types of paint and prevents the fouling or clogging of lines, pumps, nozzles and other vital spray booth working parts by accumulated paint overspray.

A booklet on Triad spray booth compounds has been prepared recently and is available upon request to the company.

●

Wabash Issues Catalogues

Wabash Appliance Corporation, 345 Corrall Street, Brooklyn 31, N. Y., has made available a number of catalogues covering Birds-Eye Infra-Red Lamps for radiant heat.

Various outstanding design features are listed. Catalogues are obtainable by writing the company at the above address.

Revolutionary Surfacing Method Announced by Brooklyn Firm

The Powder Weld Company, 419 Kent Avenue, Brooklyn, N. Y., recently announced a new flame tool which the company contends is a challenge to producers of powdered materials and promises some revolutionary welding and metal or plastic surfacing processes. The equipment consists of a torch, made in the general outlines of an ordinary welding torch, but having a special patented nozzle and 16 independent controls, many of them at the handle of the tool; a control box with air and gas pressure regulating valves; and a canister from which powdered materials are fed through the flame. The flame is generated and controlled by pre-selected combinations of gases and air.

Known as Powder Weld, the equipment is described in a bulletin issued by the maker as "a new method of welding, brazing or surfacing with infinite compositions of powdered materials." It was first shown at the recent Metal Show in Cleveland. Demonstrations of welding and hard surfacing were conducted, indicating interesting possibilities for the tool in welding or brazing with mixtures of powdered metal and dry fluxes.

Typical applications for which Powder Weld is described as being suitable are hard facing, surfacing with plastics or synthetic enamels, brazing with powdered alloys, welding with powdered metals, rod welding with projected fluxes, controlled atmosphere welding, conventional torch and rod welding, metal spraying of all kinds. The Powder Weld bulletin illustrating and describing the equipment is available on request.

●

Manderscheid Releases Catalog

The release of an unusually complete catalog of Polishing Room Accessories, Presto Bulletin 103, has been announced by the Manderscheid Company, 810 Fulton Street, Chicago 7, Illinois.

Included in this Bulletin are semi-automatic tube polishing machines, work holding

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A copy of Presto Bulletin 103 can be obtained by writing the Manderscheid Company.

•

Oakite Announces New High-Speed Steam Cleaning Detergent

A new heavy-duty alkaline type detergent, specially designed for use in modern steam guns and coil-type steam-generating mechanisms, has been announced by Oakite Products, Inc.

The new high-speed detergent, named Oakite Composition No. 92, has been pretested during the past year. Decisive reductions in time and cost allocations for such jobs as the following are said to have been recorded: Cleaning machinery and equipment parts for subsequent repair and overhaul; preparing equipment surfaces for repainting or refinishing; cleaning equipment too large for tank immersion or where suitable tanks are not available; paint stripping and other cleaning operations.

The new Oakite detergent is described as giving highly thorough and fast steam-cleaning action at very low concentrations. Specialized advantages associated with the product by the manufacturer include: prevention of scale clogs in steam coils; ready dissolution in hot water; free-rinsing action on all surfaces; safe and pleasant handling without offensive fumes or toxic vapors.

Free Service Report describing this new material may be secured by writing on company stationery to Oakite Products, Inc., 57 Thames Street, New York 6, N. Y.

•

Lisbon Hoist & Crane Now Offers Bob Cat Model Electric Hoist

The Lisbon Hoist and Crane Company, Lisbon, Ohio (successors to the Wright File Company), is now introducing its Bob Cat Model of Electric Hoists.

It is claimed to be of revolutionizing design, being half the weight of any other first-class hoist of the same capacity, making it convenient in erecting or removing where desired.

The safety factor of the Bob Cat is claimed to be six to one and better, being made entirely of steel forgings and castings, plus the cable.

The motor is entirely enclosed in drum, with patented heat dissipation construction and connection; the gears are all heat treated alloy steel; and it has ball bearings throughout.

●

Biofen Laboratories Introduces Unique Multi-Purpose Cleaner

One of the latest developments announced by Biofen Laboratories, 14 Sixth Street, Bridgeport 7, Conn., is Metclene, a unique cleaner which removes rust, dirt, grease, and oil in one operation, leaving a rust-resistant film on the surface of the metal. Paint applied to a Metclened surface is unusually adherent and will not peel according to Biofen.

Metclene can be used either in a manual operation or in a dip bath, although it is recommended that the manual method be used, especially in the presence of deep-seated rust.

This new cleaner is a clear, yellow liquid weighing approximately 9.5 pounds per gallon, non-inflammable with a *p*H of 2 to 3. It can be used on iron, steel, aluminum, brass and copper.

●

Quimby Pump Division Releases Bulletin on "Streamflow" Pump

The Quimby Pump Division of H. K. Porter Company, Inc., recently released a bulletin on "Streamflow" Rotex Pumps, which are rotary type, positive displacement pumps used for moderate or low viscosity liquids under medium pressure.

Quimby Rotex Pumps, constructed in either gear-in-head design or external gear and bearings, can be used for pumping lubricating, non-lubricating, viscous and innumerable other liquids.

Copies of this bulletin may be obtained by addressing Sales Department, Quimby Pump Company, 342 Thomas Street, Newark, N. J., or the nearest Porter-Devine-Quimby district office.

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